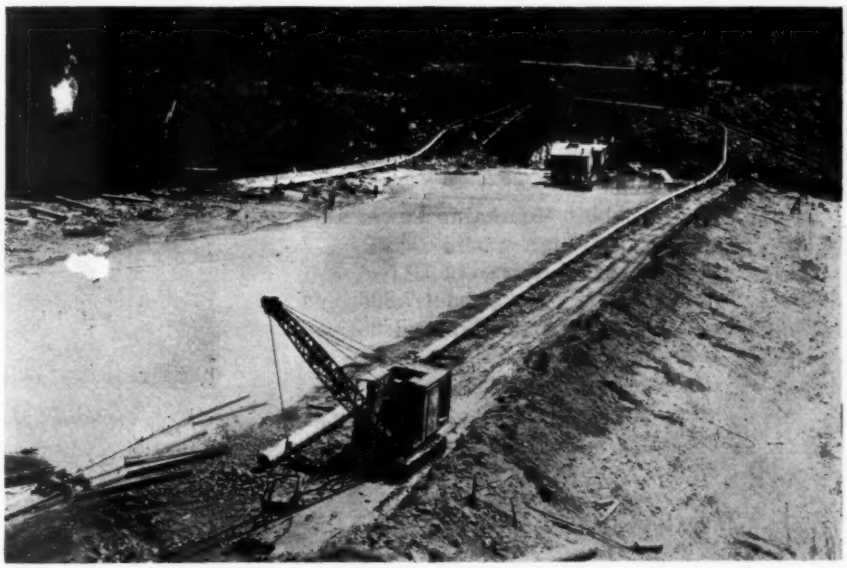
THE EXCAVATING ENGINEER
FOUNDED 1905

APRIL 1932
VOL. XXVI NO. 4

Constructing highest hydraulic fill dam at Cobble Mountain

Many interesting features on Springfield's combined water supply and water power project.



½-yard Bucyrus-Erie draglines working along the sides build up the outer slope to form a dyke to hold the settling pool.

By Harry H. Hatch.*

THE COBBLE MOUNTAIN project was conceived by the City of Springfield about twenty years ago as the best available and most practical water supply source for the city. Springfield has a population of about 150,000, and many of the surrounding towns purchase their water from the city. The metropolitan population is about 250,000 and the water consumption is around eighteen million gallons daily. With the rate of growth of the city, it became almost imperative that the city develop the Cobble Mountain project.

The project is on the Little River in the towns of Blandford, Granville, and Russell in Western Massachusetts. The Cobble Mountain reservoir site occupies what was a glacial reservoir some millions of years ago. The average run-off or the mean flow of the river at the Cobble Mountain dam is 58 million gallons daily, and the Cobble Mountain reservoir will make available 55 million gallons daily. This volume will take care of the City of Springfield requirements for more than the next fifty years.

The total cost of the project for the water supply alone would have been about $4,000,000. It is doubtful whether the city would have been able to finance this project had it not been for the combination of power, which, even though increasing the total cost to about $6,000,000, greatly facilitated the financing of the enterprise. The power was let at $270,000 a year for the next thirty years. This rental will pay for the interest and the sinking fund of the capitalization for the project. Thus the city was able not only to develop the water shed to its full capacity, but also own a power plant which will pay for itself as well as the water development.

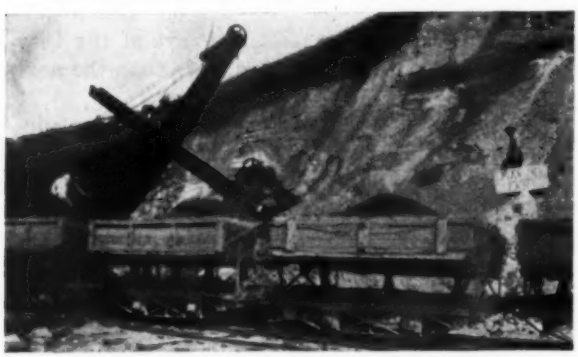
* Division Engineer, in charge of Construction for Springfield Board of Water Commissioners; Member A. S. C. E.

The Cobble Mountain development is of special interest because:

1. It is a combined water supply and water power project costing about $6,000,000, being built, perhaps for the first time in the East, by a municipality.
2. The power plant will operate on a maximum fall of head of 456 feet.
3. It includes the construction of the highest hydraulic fill dam in the world, which is the outstanding feature of the project.
4. It involves also the construction of important works such as:
   (a) The Cobble Mountain Diversion tunnel, through solid rock, horseshoe-shaped area of 12 feet diameter equivalent, about 1,600 feet long; a shaft of over 200 feet deep; gate house control works, etc.
   (b) The Cobble Mountain Power tunnel, through solid rock, horseshoe-shaped area of 10 feet diameter equivalent, about 7,200 feet long; 207 feet high and 25 feet diameter steel surge tank; one 5-foot and two 7-foot diameter penstocks about 660 feet long; power house with 33,000 K. V. A. generators; about 130 feet deep shaft; gate house, control works, etc.

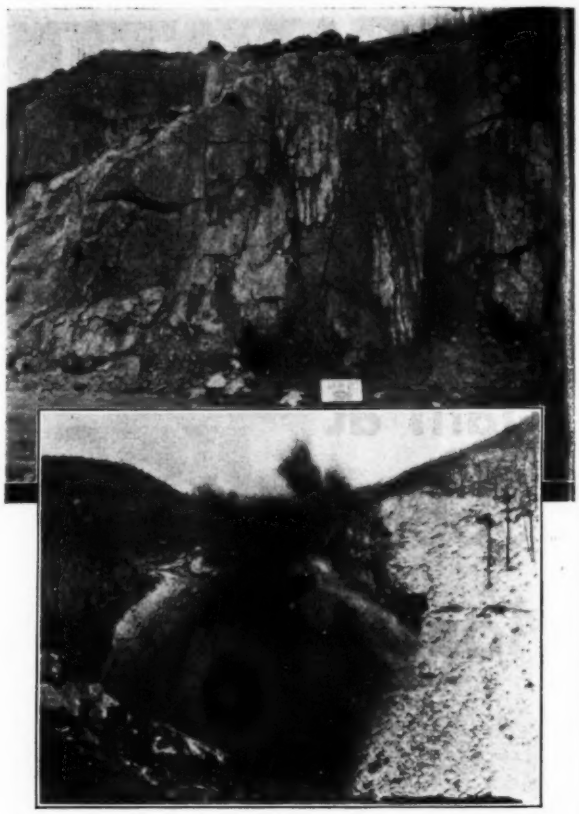
Dam Raises Water 222 Feet

In the narrow gorge of the Little River at the northern slope of the Cobble Mountain, the dam will be the barrier of the 22½ billion gallons of water in the reservoir. At the dam the water will



Excavation in the borrow pit by 50-B steam shovel.

rise 222 feet above the original stream bed. The top of the dam rises about 20 feet higher than the maximum elevation in the reservoir. This additional height is of great importance. One of the most important requirements of an earth dam is



Above: One of the small tunnels ready to be blasted.
Below: Blasting one of the tunnels in the rock quarry.

that water must never spill over its top, which requires that the spillway must have ample capacity to take care of any flood flows before overtopping is likely to take place.

The spillway is located on the southern slope of Cobble Mountain at about 1,700 feet away from the dam. It is built through solid rock and lined with concrete at the bottom and the sides for a considerable distance. The Cobble Mountain reservoir spillway will have about ten times the capacity of any known flood on this water shed during the last 25 years. Also, important is the fact that the dam does not have any kind of conduit through its body for any purpose.

At the damsite, the river follows a sinuous course in the deep gorge with steep rock slopes. The length of the dam at the stream bed elevation is about 80 feet, and at the top about 710 feet. The base of the dam has a width of 1,510 feet, and the top width is 50 feet. The height of the dam in the center from the foundation up is 262 feet.

The dam, on which S. J. Grove & Sons Company of Minneapolis was the principle contractor, is composed of: rock fill diversion dam, 79 feet high; concrete toe dam, 50 feet high; massive rock fills both at upstream and downstream toes; and hydraulic fill and core.

The total yardage of the dam is about 1,800,000. There are about 400,000 yards of rock in the rock toes and riprap in the slopes, and 1,400,000 yards hydraulic fill of which about 250,000 yards is the core. There are about 5,000 yards of concrete in the dam.

56,000 Yards Rock Excavation in Spillway Channel

The maximum cut in the spillway channel was about 55 feet with about 56,000 yards of rock excavation. Most of this rock was excavated by well drilling and shooting. A gas driven Keystone well drill was used. The starting bits of the drill were about 5¾". As soon as the hole got deeper, smaller bits were used, reducing the size to about 5 inches at a depth of 40 to 45 feet. After opening sufficiently high face, the well drill holes were placed about 8 feet to 12 feet apart in rows of about 18 feet center to center. The charges varied from 200 to 400 pounds dynamite per hole, depending on the distance from the face of the cut to the charge. As a rule there were two exploders used to each charge.

Explosives used in the spillway excavation were whatever happened to be on hand, Atlas and Hercules 40% or 60% dynamite and Hercomite, but no black powder. The charges were tamped in depth at least equal to, if not more, than the distance from the face of the cut to the charge, and they were exploded by blasting machine.

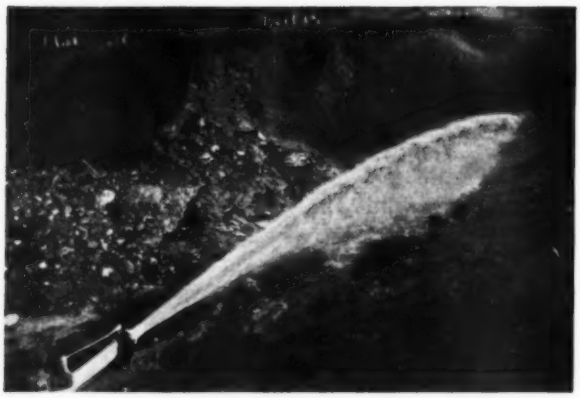
There was much interruption and irregularity in conducting the well drilling operations. For this reason it became impossible to have a continuous record of the cost data. However, the following was obtained when the work was going on at an average speed, and it can be taken as a representative example of the unit cost of operations: The well drilling average about 2 feet per hour and cost about $1.60 per foot. One of the shots was over six well drill holes aggregating to 270 feet long.

Drilling, 270 feet at $1.60	$432.00
Loading and tamping	12.00
Dynamite, 1650 lbs. at 0.14	231.00
Exploders, etc.	5.00
	$680.00

The total rock loosened was 1,600 yards, thus averaging about 1 cubic yard to 1 pound of explosive, costing about $0.43 per yard net.

The excavated rock was loaded mostly by 50-B Bucyrus-Erie steam shovels onto large trucks, and hauled to the rock toes of the dam. Payment was made not only for rock excavation in the spillway,

Dissolving box directly over the pool. The mud lines going to various beaches can be seen. The shear boards on the right beach are spreading the flow over a larger area to prevent concentrating the run into the pool. The core pool pumps are located in the pool below the dissolving box.



Excavation in the borrow pit by hydraulic method.

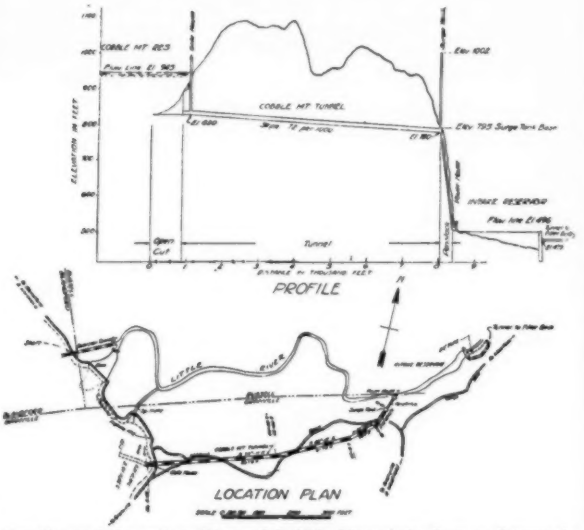
but also rock fill in the toe of the dam. Often was averaged 500 yards of rock per shift per shovel.

Part of Rock Borrowed from Convenient Quarry Sites

The yardage of rock from the excavations in the spillway, the cut-off-trenches, and the foundation of the dam was far from being sufficient to supply the yardage necessary for the rock toes of the dam, and it became necessary to establish rock quarries at convenient places near the damsite.

More than a dozen small tunnels were put in. They were about four feet by four feet, or just as small as a man could conveniently work inside. They usually had branches at the end of the adit. Depending on the weight or yardage of rock above the tunnels, charges up to sixteen tons of dynamite were placed within and exploded. The charges varied from black powder to 60% dynamite. The general averages of these various tunnels show that for every foot of coyotte hole driven, about 135 cubic yards of rock were obtained, and for every pound of explosive used there was 1¾-yards loose rock yield.

Some of the tunnels were driven and shot with the intention of placing the rock directly into final position in the rock toes of the dam. This met with success at the beginning of the work when there were no other operations going on. Later on, however, the purpose of this tunnel blasting was to loosen the rock and handle the entire blast by means of shovels. Except for the riprap rock which was handled by two 1¼-yard Osgood gas shovels, most of the rock fill was handled by three Bucyrus-Erie 50-B steam shovels using 1¾-yard dippers. Often it was convenient for the shovel to kick or roll over large pieces of rock from the borrow pit floor into place at the bottom of the dam. However, most of the rock fill was made by loading the rock onto large trucks and dumping it in place from a ramp at a higher elevation directly over the rock toe section, or hauling it down the construction roads and dumping it directly into final position. Much rock was left in the ramps, which later on was side casted into place by means of the shovels.



Profile and Location Plan of Cobble Mountain dam and tunnels

Putting in the Hydraulic Fill

Some hydraulic fill dams* are built entirely by the use of water or in other words, the excavation of the material in the borrow pits, the conveyance

---

* NOTE: Hydraulic Fill Construction.

A hydraulic fill dam differs from other earth dams due to the fact that in it all of the material is washed and that most of the fines in the borrow pit material are carried to the so-called core section in the middle of the dam, sometimes part of these fines being wasted of necessity. During the construction and for some years to come the core section will remain in a semi-liquid condition and exert a heavier pressure than water. Naturally the shoulders of a hydraulic fill dam are strong enough to resist this pressure during the construction. Eventually the core material will settle, drain out, consolidate, and become an integral part of the structure.

The main purpose of the core is to stop the passage of the water through the dam. There is no earth dam, so to speak, absolutely water tight. They all leak more or less, and the passage of water through a hydraulic fill dam will depend on the many characteristics of the core material. Among them is the particle sizes of the core material; and the smaller the core material particle sizes the longer it will take to settle, the longer it will take to drain out, and the longer it will take to consolidate. However, other things being equal, a core with finer or smaller particle sizes will leak less than the one with larger size core material.

A hydraulic fill dam involves also a very desirable arrangement of the placing of shoulder materials. The theory is, and in practice we almost always find, that the further away from the center of the dam, the larger is the size of materials in the dam. And again, the further away from the center of the dam, the more compact we find the dam material, and it has a much heavier weight per cubic foot of material. In the gradual decrease of the sizes of dam material from the extreme edges of the dam towards the center of it, there are ample drainage facilities for the core water to drain out. If the shoulders of the dam did not provide for the passage of the water from the core the latter would never attain its comparatively ultimate consolidation during the usual period of time.

It should be pointed out here that there is a big difference between the hydraulic fill and semi-hydraulic fill dams. In the semi-hydraulic fill dams, the material is brought to the site, and usually dumped from a trestle and only a portion of this dry dumped material is washed into the segregation pool which forms the core of the dam. The difference between the two types of dams is very evident, as unlike the hydraulic fill dam, in the semi-hydraulic fill dam sometimes a very big portion of the shoulder is left dry without any tamping other than the passage of trains over the trestles in the fill, and that not all of the shoulder material is washed and not all or practically all of the fines taken away from it.

In the case of the hydraulic fill dam, as the material is discharged at the outer slopes of the dam near the dikes, the larger particles drop out first due to their heavier weight, and then the smaller and smaller until the very fine material goes into the pool with the water. There is a natural slope from the point of discharge down to core pool. The arrangement of the particles takes place automatically, but in the semi-hydraulic fill there is no such graduation of the material. There is therefore a big difference in the drainage facilities of the two kinds of structures.

The dikes are built by the draglines to prevent the discharge, material and water, from going down the outer slopes of the dam which also would cause washouts during construction.

of the material to the site of the dam, and the placing of the material at the dam, are done entirely by means of water. It is also common to build hydraulic fill dams by excavating the material by means of shovels or other excavators and conveying it to the damsite by means of trains or trucks and then washing it into the dam.

Both of the above methods of construction were applied at the Cobble Mountain dam.

160,000 Yards Placed by All Hydraulic Methods

About 160,000 cubic yards of hydraulic fill in the lower 65 feet of the dam were placed by entirely hydraulic operations.

In the borrow pits near the dam, the material was excavated by means of hydraulic giants which were supplied with sufficient water under sufficient pressure to break up the hardpan from its original formation. The water was brought to the borrow pits from the nearby river by means of pumps and steel pipes, and the excavated material with water was carried down to the dam by means of steel pipes, so called mudlines. The flow in the mudlines had an average of about 7½% material and 92½% water. In other words, it took more than 12 times the water to carry one yard of material in the mud line and also it meant pumping water more than 12 times the volume of the excavated material deposited in the dam. Of course, the pipes had sufficient slope, say about 4%, to carry the material and the water, otherwise there would be clogging in the pipes.

On the dam, one on each beach, constantly were used two ½-yard, Type No. 1020 Bucyrus-Erie gas draglines. During the sluicing as the material was discharged at the end of the sluicing pipe, the draglines excavated gravel as it was deposited and placed it back of the pipe line building the outer slope of the dam in the shape of a dike, which also prevented the flow of the material and water from running down the outer slope of the dam.

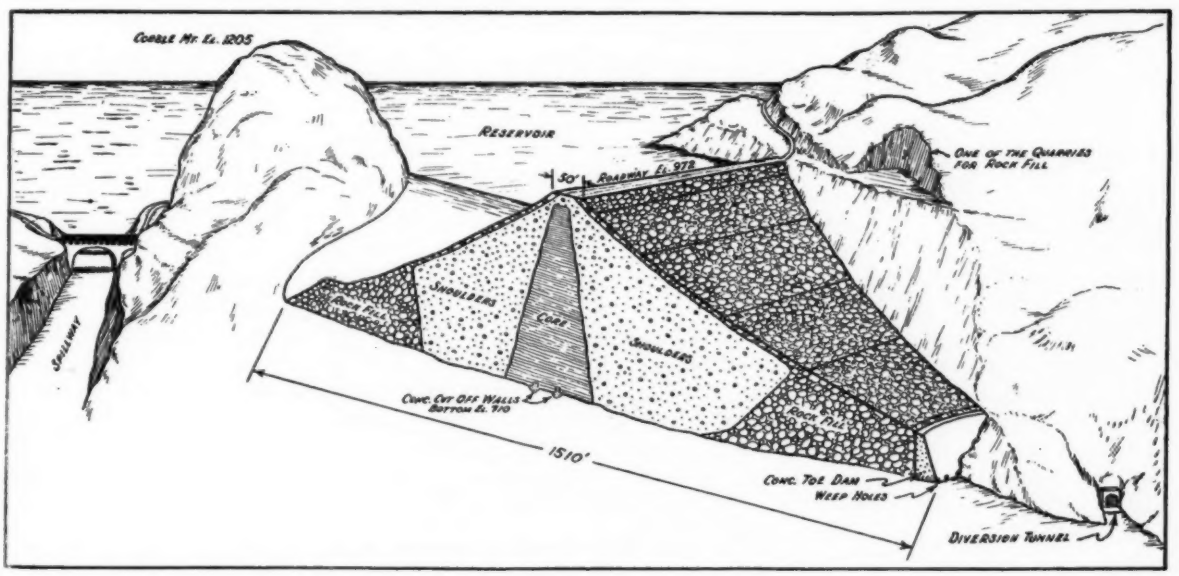
The draglines were used also in taking out the pipes one by one as the sluicing progressed. They

Giants washing the material in the dissolving box down to the dam. A train just pulling out after unloading the cars.

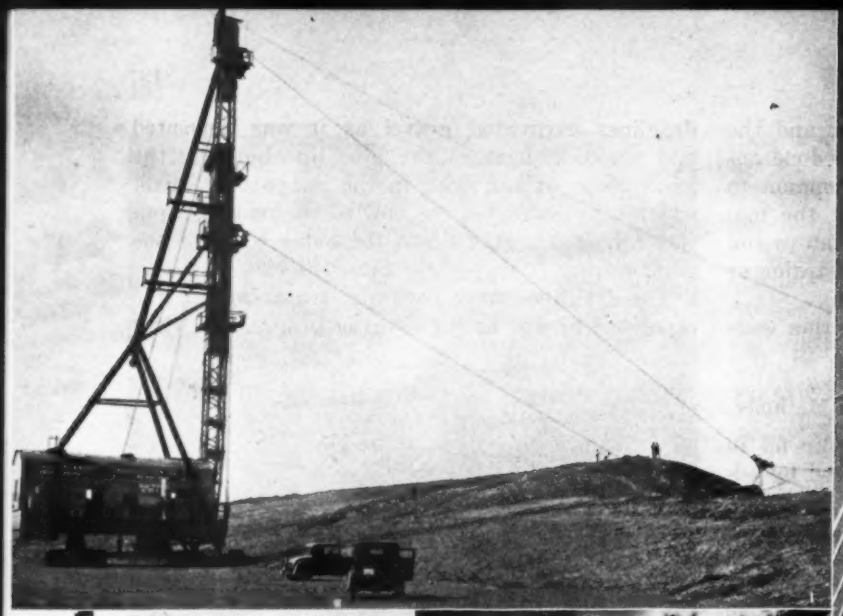
were also used in laying the sluicing pipe over the whole length of the beach.

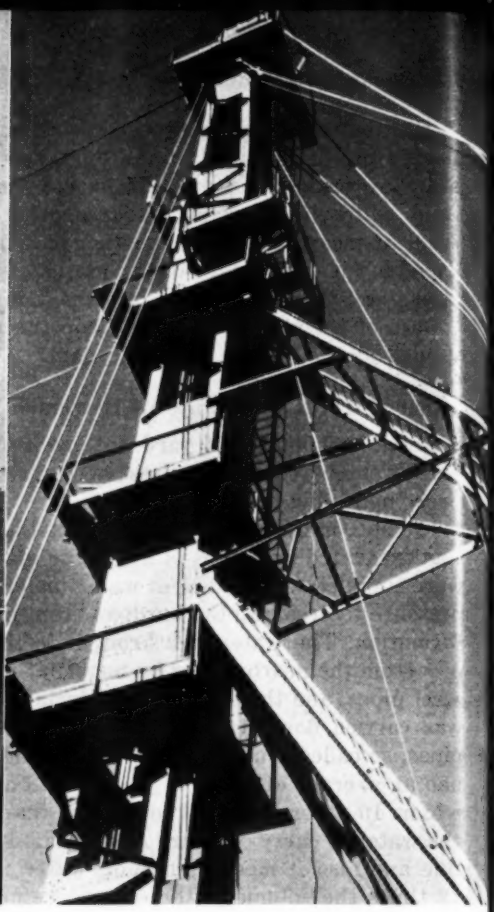
Sometimes, unavoidably, due to excessive flow or lack of being able to spread the flow uniformly all over the beach, tongues of coarse material used to go into the core of the dam. The draglines were used to dig out this undesirable material within the core section and spread it over the beach area.

(Continued on Page 216)



Sketch showing method of construction.





1. Near Greenville this steel tower excavator moves big yard for Callahan-Walker Construction Company. The head tower 130 feet in height, the tail tower 50 feet. 2. Every pass of t 12-yard Bucyrus-Erie bucket puts a young mountain of dirt i the levee. Contractor on this job is Brooks-Callaway Co., Inc., Atlanta. 3. Against this sunset sky we see a P&H dragline load Euclid wagons pulled by Caterpillar Sixties on a levee job of t tional Dredging Company at Onward, Mississippi. 4. Looking at the head tower of H. E. Culbertson Company's tower excavat completing a large levee job at Mhoons Landing near Tunica, M sissippi. D. G. Brown, general superintendent, is ready to start their new job west of Clarksdale, Mississippi.

Progress and Forecasts on Mississippi River Control

95,138,592 yards placed in levees during 1931

EXCELLENT progress was made during the past year in the gigantic task of controlling the waters of the Mississippi Valley but there is still a vast amount of work to be done before the project is completed and adequate flood control assured. During the 1931 season alone there was placed in the levee system, under supervision of the U. S. War Department engineers, over 95,000,000 yards of earth . . . almost as much as the total original excavation for the Panama Canal . . . about half the total yardage of the main canals and branches of the great Sukkur Barrage irrigation project in India.

The Mississippi flood control program under the present plan was placed in the hands of the army engineers in 1928 following the topping of some of the inadequate levees by the devastating waters of the 1927 floods. The 1928 congressional action approved a 10-year plan, appropriated $325,000,000. The army engineers led by Major General Lytle Brown, Chief of Engineers, U. S. Army, with excellent co-operation on the part of the river contractors, have already completed about 50 per cent of the scheduled program.

The splendid progress made during the season of 1931 is summed up in the following paragraphs through the courtesy of the various district offices of the U. S. Engineers.

New Orleans District

Lt. Col. J. N. Hodges, District Engineer, Second New Orleans District*, summarizes the 1931 work under supervision of his office as follows:

Bank Revetment (concrete mat) . . . 7,324 lineal feet of bank was revetted.

Upper Bank paving . . . 260 squares of rip-rap were placed involving the use of approximately 750 tons or 500 cubic yards of rock.

Levees . . . approximately 40 miles of new and enlarged levee were constructed and completed, requiring the placement of approximately 13,000,000 cubic yards of earth.

In addition to levees completed approximately 59,000,000 cubic yards of earth work was under contract during 1931, of which 19,000,000 cubic yards have been placed to date bringing the total placement 32,000,000 yards with 40,000,000 carried over into 1932 on old contracts.

Bonnet Carre Spillway . . . 365 cubic yards of class "A" concrete was placed, completing the structure. 2,012,000 cubic yards were placed in side levees leaving a remainder of approximately 750,000 cubic yards to complete the side levees.

*NOTE—The first New Orleans District handles no Mississippi River flood control work, its principal activities being in connection with the Intracoastal Waterway.

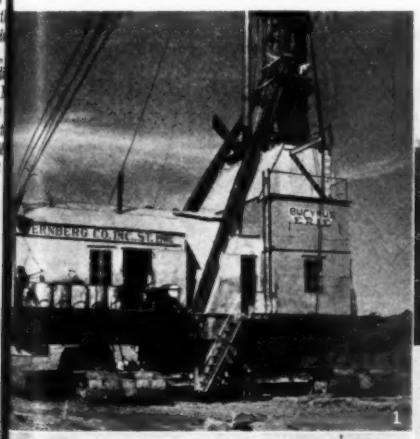
Vicksburg District

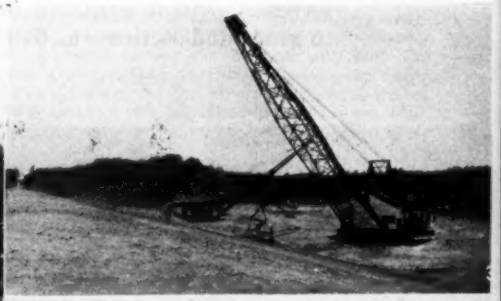
Major T. B. Larkin, District Engineer of the Vicksburg District, summarizes work under his jurisdiction for 1931 as follows:

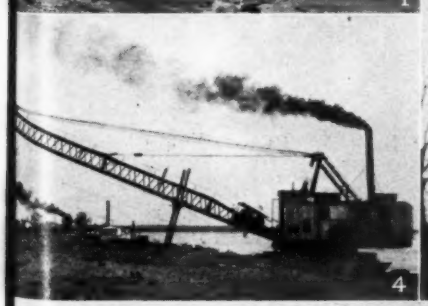
Bank revetment (concrete) . . . 5,000 lineal feet.

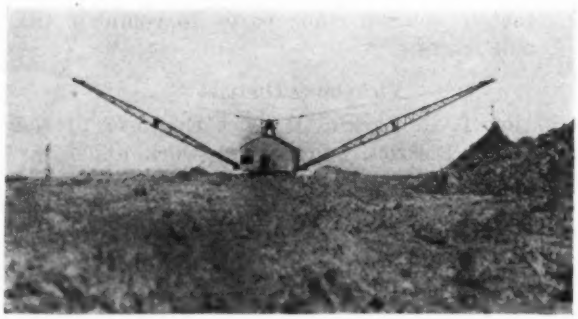
Levees . . . 35,592,000 cubic yards were placed in levees . . . 89.2 miles of levees were constructed.

1. This view on the work of Sternberg Co., Inc. of St. Louis gives some idea of the size of the tower excavators. Note the pitman having his afternoon lunch under the stairway. These machines can operate over extremely wide borrow pits frequently working spans of 750 feet or more. 2. Near New Quincey, Louisiana, we see the 50-foot tail tower of Blanks Construction Company's tower excavator. It moves along on crawlers, driven by a Wisconsin gas engine, on the river side of the borrow pit. 3. This snap came from the Boyce & Igo job on the Plaquemine Point levee and shows two of their Bucyrus-Monighans, a 6-W and 3-W. 4. And this a Bucyrus-Erie bank grader used to prepare the banks for the concrete revetment mats. The handles carry a sort of large bulldozer blade which pulls the dirt down the bank to the desired grade and excavates under water as well as above. The machine is scow mounted and can grade about 100 feet of bank at one setting. At the time this picture was taken it was operating near Keys, Tennessee. 5. Out for a seven mile stroll this 6-yard Bucyrus-Monighan walker owned by C. I. Jones cuts across country to a 2,130,000 yard job below Baton Rouge, La. 6. Orleans Dredging Company is constructing this levee. The Browning in the foreground is loading to Euclid wagons behind Caterpillar Sixties. A dredge and other draglines may be seen in the background. 7. Here is a panorama of the Brooks-Callaway Co., Inc., tower excavator. The Bucyrus-Erie 43-B in the foreground trims the slopes behind the tower thereby increasing the output of the big machine.









Here is a two-boom dragline designed and built by F. M. Crane. The machine is used on the levees being built by F. M. Crane Company near Mound, Louisiana, and carries two 2½-yard Omaha buckets. The operators sit opposite from one another and both use a single swing lever which controls all swinging motions of this unique machine.

In addition to levees constructed 18,120,000 yards remained to be moved in work already under contract January 1st, 1932.

Memphis District

Major Brehon Somervell, District Engineer for the Memphis District, sums up the work of 1931 in the Memphis District as follows:

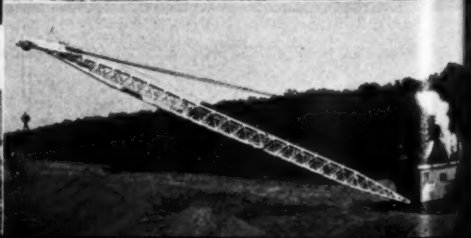
Permeable Dikes . . . 2,534,286 lineal feet of piling was placed in dikes constructed . . . 160,105 cubic yards of stone and 8,424,951 board feet of lumber were used in mats. The lineal feet of permeable pile dike placed was 76,354 feet.

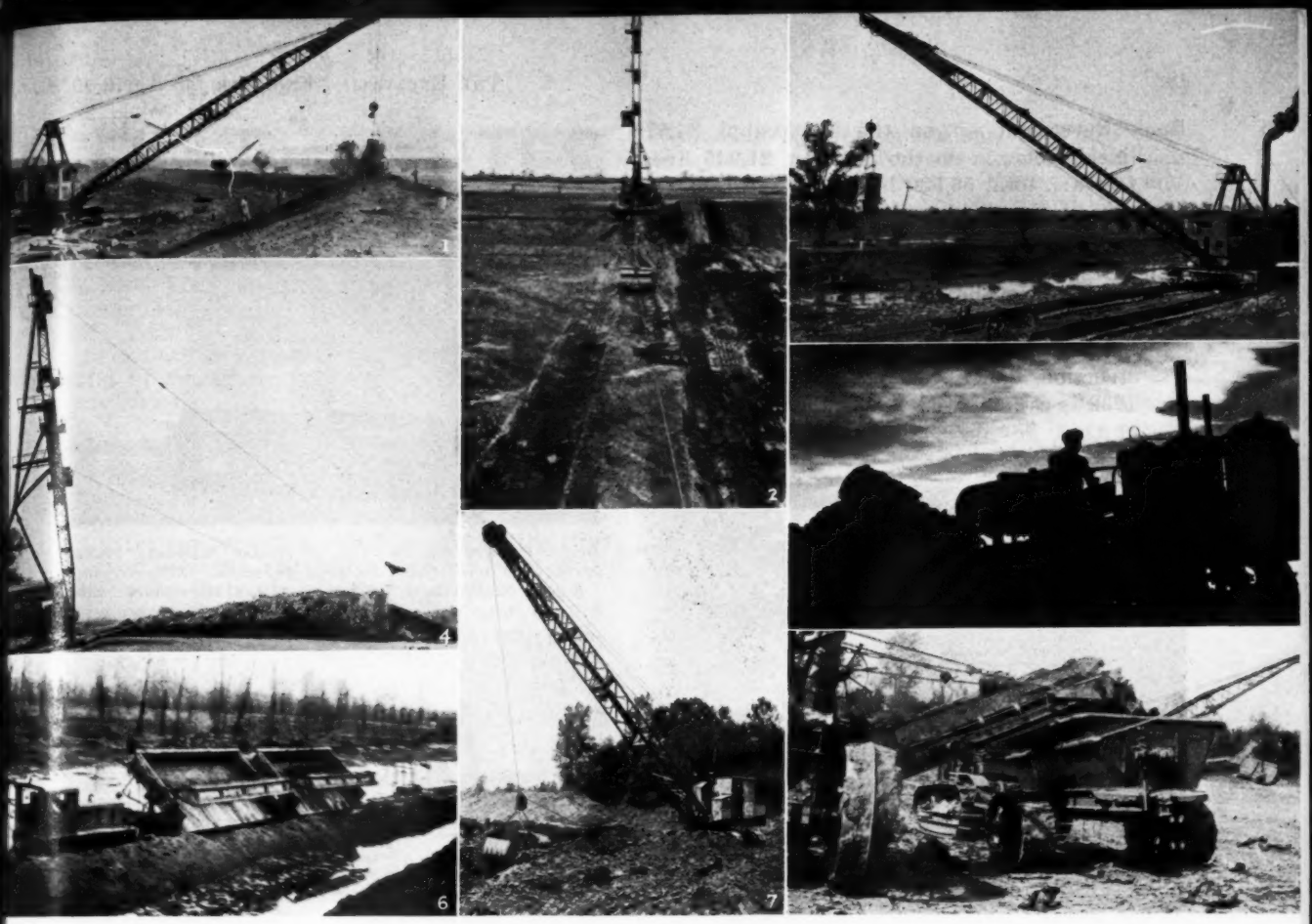
Levees . . . 22,709,750 cubic yards were placed in levees . . . total length of levees constructed to grade and section was 64 miles.

The total amount of yardage in levees under contract on December 31, 1931 was 14,152,000 cubic yards, of which about 71% had been completed. This leaves approximately 4,400,000 yards to be moved in 1932 on old contracts.

The quantities involved in dike contracts in force on December 31, 1931 were: 947,448 lineal feet of piling, of which which about 79% had been driven; 30,250 cubic yards of stone, of

1. A portion of accurately finished levee with borrow pit at right. 2. When a Bucyrus-Monighan walker goes ahead it "backs up". Note the large bearing area on these machines. This one is owned by the W. E. Callahan Construction Company of St. Louis, carries an 8-yard bucket and 160-foot boom; it is a Diesel-electric with Fairbanks-Morse engine and General Electric motors. Ward-Leonard control. 3. The River itself makes the best highway for most of the River contractor's moves. Here is the way M. W. O'Meara loads his Bucyrus-Monighan 6-W and 3-W on a barge for a ride to another job. 4. R. T. Clark uses mules and Caterpillars for hauling on his job near Decson, Mississippi. But when the mules wear out they are replaced with the more modern and economical mechanical "mule". Western wagons on Athey Truss wheels carry the loads behind the Cats. 5. Here is a Kochtitsky & Johnson, Inc., job of levee enlargement at the end of Scotts Favor Pike in Arkansas. 6. Jones & Rodgers use this latest model Western Wheeled Scraper Company elevating grader on their levee work. This machine is built around a 10-inch steel tube as a backbone. 7. Piling a heaping load on one of the Trackson wagons on Chas. Aderholdt's job near Sherrard, Mississippi. Note the sunshades that keep the darky Cat drivers from getting sunburned. 8. Aluminum booms have given the levee builder longer reach for his draglines. Here is a Bucyrus-Erie Class 230 dragline owned by Grasser Contracting Company using a 175-foot boom and 6-yard bucket on levee work. For description of operations of this contractor in the Teche Country, Louisiana, see Excavating Engineer, January, 1931. This new 4-mile levee eliminated 35 miles of old levee. Virgin forest, buckshot, plain mud, blue clay, and water did not prevent the Grasser organization from moving an average of 187,000 cubic yards per month using a 6-yard bucket and 150-foot boom.





which about 58% had been placed; and 3,442,-919 feet board measure of lumber, of which about 93% had been placed.

98,794—lineal feet of bank was protected with new revetment during the year, the work being done by twelve Government-owned revetment plant units. The work involved 125.76 acres of clearing, 3,744,279 cu. yds. of grading, 76,434 squares of butt slab mattress, 56,534 squares of concrete in situ, 21,814 squares of butt slab paving, 95,065 squares of articulated slab mattress, 5,096 squares of articulated slab paving, 29,839 squares of fascine mattress, 3,004 squares of stone paving, and 21,516 squares of plain concrete mat. A square is an area of 100 square feet.

Considerable maintenance work was also done. This work included 103.46 acres of clearing, 442,720 cu. yds. of grading, 19,604 squares of fascine mattress, 6,323 squares of stone paving, and 57,683 squares of various forms of concrete slabs.

St. Louis District

Capt. L. S. Dillon, Military Assistant writing for Major W. A. Snow, District Engineer, St. Louis District, gives us this summary of work in that district:

Permeable Dikes . . . on the Mississippi River 45,955 lineal feet . . . on the Missouri 77,600 lineal feet . . . total 123,555 lineal feet.

1. Brooks-Calloway Co., Inc., on this job near Gould, Arkansas, use a Class 230 Diesel-electric and 50-B steam Bucyrus-Erie draglines. The 230 uses Atlas Imperial Diesel engines and General Electric equipment. 2. Looking across the borrow pit from the tail tower on Clark Bros. Construction Company's tower excavator work on the New Madrid floodway in the Memphis district where they operated on a 700-foot span. Their output with this machine has run as high as 231,000 yards per month. The Clark tower is electrically operated, equipped with G. E. motors and Ward-Leonard control. The contractor operates his own power plant consisting of two 400 h.p. Busch-Sulzer Diesel engines operating Westinghouse generators. (See article March, 1931, Excavating Engineer.) 3. Lewis Chambers Construction Company of New Orleans use two of these Bucyrus-Erie Class 230 steam, truck-mounted, draglines on their levee work. They are equipped with 150-foot booms and six-yard buckets. Their work on the 23 to 29 foot Upper Morganza and New Texas levees totaling 2,350,000 cubic yards protects 2,500 square miles from flood danger. Four trips along the levee are usually required with these draglines, the first cut casts material from the river side of the borrow to a spoil pile, the second moves this material to land side of levee, the third takes the center section of the borrow pit and puts it in the river side of the levee, the final trip tops off with material from the levee side of the borrow pit. (See July, 1930, Excavating Engineer.) 4. E. F. Powers Construction Company of West Palm Beach, Florida, piles up the dirt with two of these Tower machines. This one uses a 12-yard Bucyrus-Erie bucket and moves as high as 12,000 cubic yards a day. This contractor has placed some 7,200,000 yards in 18 miles of Mississippi levees. E. F. Powers Construction Company uses Caterpillars, Western and Smith wagons, and Northwest draglines to place a 10-foot lift in the back of the levee section on which their head towers work, thus increasing the limit for gravity return of the bucket. (For a description of their work see our February, 1932, issue.) 5. Most river contractors operate 24 hours a day. Here against the sunset, is a Caterpillar Sixty with Smith wagon loaded to capacity on top of a section of levee being built by Lowrance Bros. 6. At Alsatia, Louisiana, Boyce & Igo used the Shea method of levee construction. Western cars hauled by Vulcan locomotives dump into a pit dug for the purpose and the material is handled from the pit to the levee by a dragline. 7. This Bucyrus-Erie 43-B gas dragline is building levee for J. J. McKeithen of Westdale, Louisiana on their operations near Bayou, Louisiana. 8. Morrisey Construction Company of Vicksburg use this Caterpillar elevating grader to load to Trackson wagons drawn by "Cats" near Longwood, Mississippi.

Bank Revetment . . . on the Mississippi 34,575 lineal feet . . . on the Missouri 21,945 lineal feet . . . total 56,520 lineal feet. In construction of the dikes and revetment referred to above there were used 3,064,040 lineal feet of piling, 16,523,400 feet board measure of mattress lumber and 357,320 cubic yards of stone.

Levees . . . approximately 30 miles built involving placing of 2,167,330 cubic yards. Levee construction under contract carried over into 1932 is estimated as 230,000 cubic yards.

Ten Caterpillar tractors, three elevating graders, five LaPlant Choate wagons, three Smith wagons, two Streich wagons moved the dirt on this million-yard levee at Pecan Point, Arkansas, for Lowrence Brothers & Company of Driver, Arkansas. The levee is 220 feet wide, the haul 550 feet from base of levee. Yardage ran about 4,500 cubic yards per 24-hour day with a record month of 118,000 yards.

Rock Island District

Lt. Colonel Glen E. Egerton, District Engineer, Rock Island, Illinois, District, summarizes the 1931 work under supervision of his office as follows:

Levees . . . Approximately 10.5 miles of new and enlarged levee were constructed and completed, requiring the placement of approximately 657,-512 cubic yards of earth. Levee construction under contract carried over into 1932 is estimated at 1,606,268 cubic yards.

Driver Construction Co., Inc., of Driver, Arkansas, walks in to the job with their Bucyrus-Monighan 6150 carrying a 6-yard bucket on a 170-foot structural aluminum boom.

McWilliams Dredging Company uses a Bucyrus-Monighan Special 6-W with 5-yard bucket and 150-foot boom near Beaudclonville, Louisiana.

Work Contemplated for 1932

It is, of course, difficult to give a positive forecast of work to be let this coming season. The following tentative figures represent expectations at the present writing:

In the Second New Orleans District it is proposed to let approximately 26,000,000 cubic yards

(Continued on Page 195)

Henry Hughey Co. Inc. of Memphis used a Bucyrus-Erie 43-B dragline (at left) to grade the river bank at Memphis. In thirty-three ten-hour shifts they moved approximately 49,800 cubic yards. In the center we see a combination of dragline and tower excavator operation on the work of Callahan-Walker Construction Company near Greenville, Mississippi. In the foreground a 43-B Bucyrus-Erie loads to Caterpillar-drawn Streich wagons which dump their loads to form the base of the levee on the far side. The Bucyrus-Monighan walking dragline seems to be taking out the core trench while the Bucyrus-Erie tower excavator, moving partly on the slope of the first section put in by the wagons, piles the bulk of the dirt to bring the levee to its finished cross section. At the right we see a Bucyrus-Monighan 4-W crossing over a levee north of New Madrid, Missouri, where the owner, Roth Construction Company, had a million yards to move. Note the stumps in the borrow pit beside the finished enlarged levee.

FIELD NOTES

Dealing With Municipal Officers

AN EXCAVATING CONTRACTOR visiting in New York would not be apt to let some stranger sell him the Holland Tunnel or Grant's Tomb. And yet that same contractor might go home and actually rely upon the right of some city official to award an excavation contract that the official has no more legal right to award than the chap in New York had to offer the tunnel or tomb for sale.

To illustrate, a contractor for the excavation of a pump-pit for a city believed the city commissioner of waterworks when that officer assured him that extra compensation would be paid by the city for enlarging the excavation beyond what was called for by the contract with the city.

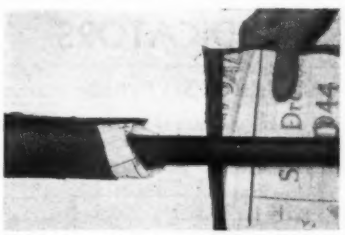
The contractor did the extra work, but he did not get the extra pay, because the charter of the city provided that no contract with the city should be altered without the approval of the board of city commissioners. (J. A. Kreis & Co. v. City of Knoxville, 237 S. W. 55.)

The Tennessee Supreme Court applied in that case a fundamental rule of law that ought to be known to every one who deals with a municipality —that every one is presumed to know what officials are empowered to bind the municipality by agreement, and presumed to know just how far the law or city charter permits a certain officer to act in its behalf.

—A. L. H. Street, Attorney-at-Law.

Practical Emergency Lagging for Small Water Pipes

A RATHER SIMPLE but excellent emergency method of lagging a short length of water pipe is shown above. Folded newspapers were first wrapped snugly around the pipe and tied firmly on. Strips of an old tire inner tube were then wrapped around the paper and tied. Paper is an excellent insulation against cold, and the rubber protected the paper from snow and sleet. In a pinch, in many places the above can be nicely used to protect pipes which occasionally freeze up not hard enough to split them, but enough to require a troublesome bit of work to get the water started again.



—Frank W. Bentley, Jr.

500 Children Injured Each Year by Blasting Caps

THE INTEREST in the campaign to protect children from the dangers of playing with blasting caps has grown from day to day since its inception by the *Institute of Makers of Explosives* in June, 1926. Although specific warnings are given to buyers to see that blasting caps are not left where children can find them, approximately 500 boys and girls under sixteen years of age are injured each year as the result of playing with them. Sometimes five and six children are injured in one detonation.

Following blasting operations, caps are often carried home and children are not advised of their danger. Workmen put them in their pockets and, in various ways, they are pulled out and left lying along highways or near the scene of work. Caps left near construction and quarry operations are responsible for a number of tragedies, as childish curiosity leads the victims to these haunts day after day in search of adventures.

See that caps are kept locked in a safe place on your job!

Handy and Excellent Substitute for Blotter

CONTRACTS, orders, releases and other papers are often signed or changed with the fountain pen out on the job where the usual office conveniences are as scarce as the proverbial hen's teeth. Only too often the usual orderly pen gets an unruly streak and drops ink enough on an important paper in one place to copy the Declaration of Independence. With no blotter handy, one is in about as bad a fix as our friend "Andy" gets into. Take a cigarette, (any brand, this is not advertising) moisten the end a bit and touch it to the "pool" of ink on the paper. It will quickly absorb it, and leave the spot as clean and dry as the Sahara desert. A handy one, not thot of usually in a pinch of this kind. Try it next time.

—Frank W. Bentley, Jr.

When Contractor's Bond Covers Appliances

THAT a public contractor's statutory bond to pay for "materials" and "supplies" furnished him by third parties for use on the bonded job may include appliances is shown by a decision lately rendered by the California Supreme Court in the case of A. L. Young Machinery Co. v. Cupps, 2 Pac. 2d, 321.

The machinery company sued on a highway contractor's bond of the above character, to enforce payment for a bucket elevator, screen, drag scraper, pulleys, belts, lanterns, hose, etc. The bonding company denied that the bond covered such articles, contending that they constituted part of the contractor's permanent equipment usable on successive jobs. The Supreme Court disposed on that question by laying down the following general rule governing such controversies:

"It is our opinion that the expressions 'materials' and 'supplies' found in the statute are sufficiently broad to include equipment of the nature involved herein, *when such equipment is purchased for the particular job, and is entirely consumed thereon,* except for normal salvage value. It is true, of course, that the purchase price of equipment capable of being used on more than one job, and which becomes a part of the contractor's general equipment, is not covered by the statute, but when the equipment is of such a nature that in the usual course of events it will be entirely used and consumed on the particular job for which it was purchased, it is our opinion that such equipment is included within the meaning of 'materials' and 'supplies,' as used in the statute."

The court cites a similar conclusion reached by the South Dakota Supreme Court in the case of Dennis v. Enke, 224 N. W. 925.

—A. L. H. Street, Attorney-at-Law.

THE EXCAVATING ENGINEER
FOUNDED 1906

A Monthly Publication Devoted to Excavating and Allied Subjects

REGULAR SUBSCRIPTION: $1.00 a year for 12 months.
SPECIAL SUBSCRIPTION: Upon application on card inserted in this number, The Excavating Engineer will be sent frequently (not regularly) free of charge. Only for those engaged in the industry of excavation.

THE EXCAVATING ENGINEER PUBLISHING CO.
F. O. Wyse, Managing Editor—Arnold Andrews, Editor
E. M. Heuston, Advertising Manager.
South Milwaukee, Wisconsin
Printed in U. S. A.

The Business Situation

NOT LONG AGO someone asked a somewhat noted financier when he expected the depression to end. He replied that he did not know when it would end, but that he was sure of one thing, "The up-turn would have been in progress for some six months when he discovered it." It has always been true that recovery starts in without showing very definite signs until after it is well underway. The past few months have been exceptionally "blue" and the seasonal increase in business activity has, so far, not been as much as was expected. In spite of these rather obvious signs, however, it seems as if the foundation were now laid for a change in the direction of the tide. The Reconstruction Finance Corporation is apparently accomplishing the objects for which it was formed as is shown by the practical elimination of the names of National banks from the list of bank failures. As this is written there have been only two National bank failures in the last seventeen days while three National banks have reopened their doors.

The anti-hoarding campaign has done much to awaken public realization of the fact that a hidden dollar is a dangerous one. And as these dollars have come out of hiding they have generated a more optimistic feeling not only among business men but among the public in general.

Bond prices have become quite a little stronger in the past few weeks and while the stock market has, and probably will continue to have its ups and downs, its action and reactions have indicated a much stronger technical position than it has enjoyed for a good many months.

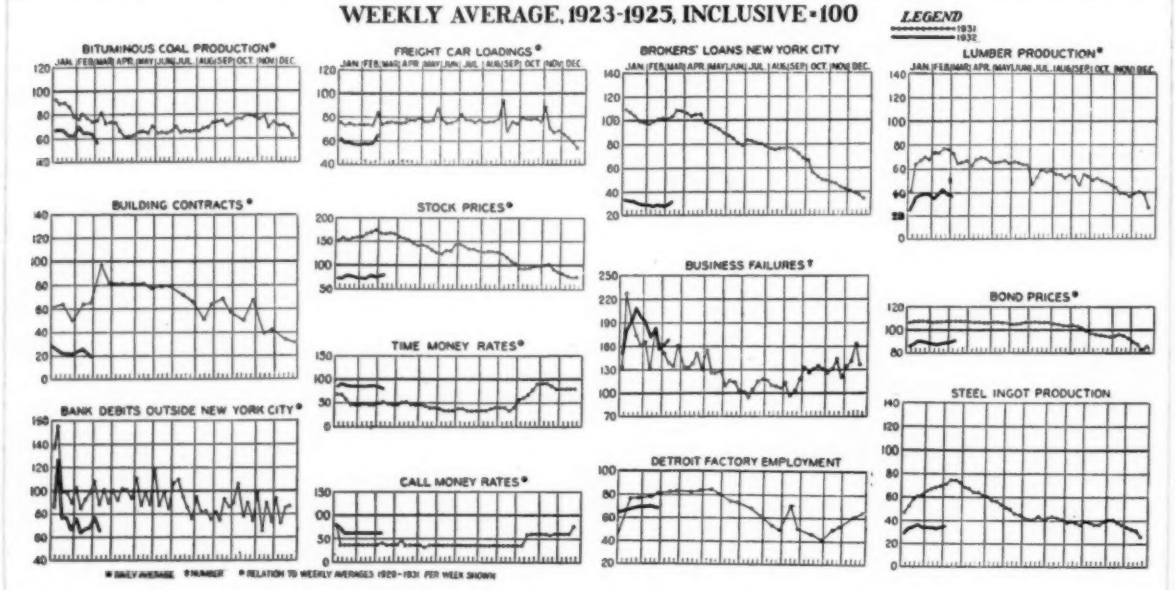
In general Mr. Average Business Man has reached the point where he is pretty well adjusted to the new order of things and is standing by waiting for signs which will warrant his bringing his stock up to normal. We have now been through more than two years of hand-to-mouth buying and in general inventories are being held at the absolute minimum. Firming prices and better feeling in regard to business will be the factors that will start the expected increase in business activity.

A gain of almost 5 per cent in construction awards during February as compared with the low figures of January reflects a normal rise approximating seasonal proportions according to *F. W. Dodge Corporation*. Losses from February 1931 were registered in all four of the major construction classes with public utilities making the best relative showing and public works and residential building the poorest comparisons.

The $89,045,800 total in new construction awards for February was divided among the four major construction classes with $24,417,300 going to residential building, $36,347,700 to non-residential building, $15,633,400 to public works, and $12,647,400 to public utilities.

For the first two months of 1932 construction awards of all descriptions in the 37 states east of the Rockies are reported by *F. W. Dodge Corpora-*

WEEKLY BUSINESS INDICATORS



tion to amount to $173,844,200. The four major classes were represented in this total as follows: $51,921,600 in residential building, $69,585,400 in non-residential building, $35,127,400 in public works and $17,209,800 in public utilities.

Compared with January, six territories reported contract gains in February. These were the Southeastern with $5,570,100 in new contract; the Chicago district with $17,196,900; the Central Northwest territory with $3,161,300; the Kansas City territory with $5,665,300; the New Orleans territory with $3,214,000; and the State of Texas with $7,078,000.

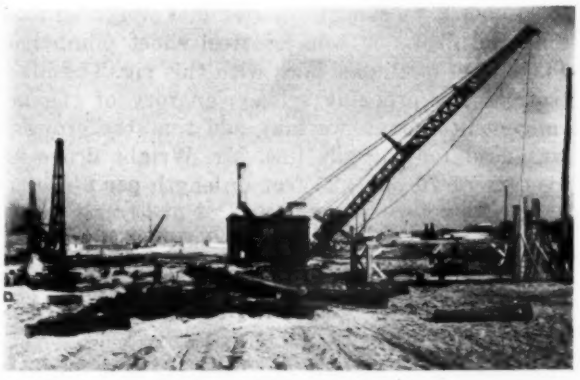
Not one of the thirteen districts comprising the 37 states east of the Rockies was able to show February contracts ahead of those reported for a year ago; but the best relative comparisons were made in the Central Northwest, Chicago, Kansas City, and Texas territories.

World's Largest Grain Elevator for Port of Albany

THE accompanying picture shows an early stage of construction of the world's largest grain elevator. It is being built for the Port of Albany, Albany, New York, by the James Stewart Corporation of Chicago, Illinois. This project was started on October 12th, 1931, and when completed will be the largest single unit of this type under one roof and will have a capacity of 13,000,000 bushels of grain. Actual construction is in charge of P. C. Metz, of the James Stewart Company and H. W. Sinks is acting as Assistant Superintendent.

Excavation for the job involved 26,000 cubic yards and was done by the E. V. Carey Company of Albany, New York. Mr. Carey used a one-yard gasoline shovel and International trucks.

The picture shows the next stage of the work. This calls for driving 10,000 piles of 35-foot length. This is being done by the D. E. Horton Company of

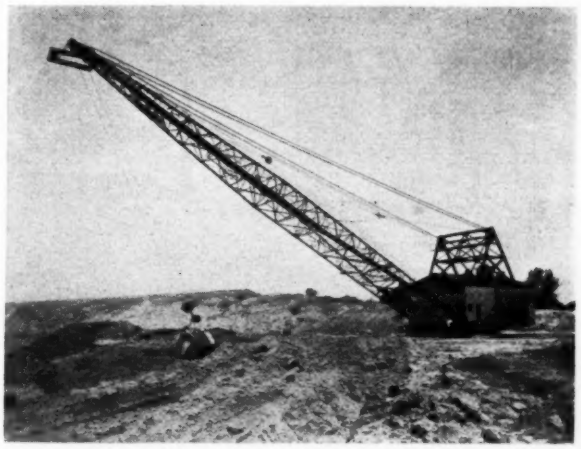


Buffalo. The Horton Company is using three pile driving rigs on skids and rollers, a Bucyrus-Erie 41-B steamer and a half-yard Browning crane for handling piles. The machine in the foreground is the Bucyrus-Erie 41-B and attention is called to the idea the Horton has worked out by placing an auxiliary steam engine on the foot of the boom which is used for raising and lowering the leaders when driving round wooden piles. With this extra engine on the boom, the work is speeded up considerably as the two regular drums on the machine are used for the hammer and the pipe line and all operations are controlled from the operator's seat. Steam for the hammer is, of course, furnished from the Johnston boiler on the machine. The 41-B is operated by John Harley of Buffalo. Henry Weller, of the Horton Company, is in charge of the pile driving work.

The boom sticking up between the 41-B and the pile-drivers belongs to a Bucyrus-Erie Gas+Air crane. It is owned by the Albany Gravel Company and is being rented by the James Stewart Company for general utility crane work. Reno Green is operating the Gas+Air machine and by the way should be given honorable mention for the way he keeps his rig looking at all times. To the right of the 41-B can be seen the central mixing plant ready for business. There will be 60,000 cubic yards of concrete in the elevator building. The Port of Albany will probably be one of the largest grain handling ports in the world when the elevator goes into operation.

Mississippi River Control Progress

(Continued from Page 192)



R. E. Cotton Company of Newellton, Louisiana, uses this Bucyrus-Monighan 6160 on their levee work near Wayside, Miss. The ability of these walking draglines to step off in any direction, enabling them to work back and forth across the wide borrow pits, has made them very popular along the River.

in the form of levee construction. This is to be moved in addition to the 40,000,000 yards of river levee and 750,000 yards of Bonnet Carre Spillway levee carried over on old contracts.

It is also proposed to place approximately 9,500 lineal feet of concrete mat bank revetment.

In the Vicksburg District expected lettings for levees will total about 5,500,000 cubic yards within the next three months river stages permitting. There is also the 18,120,000 yards to be moved on existing contracts. In addition there is planned other proposed work for this district aggregating about 25,000,000 cubic yards which has not been approved and as a consequence no definite information can be given at this time as to just how much of this will reach the bidding stage this season.

In the Memphis District the forecast for levee bidding in 1932 calls for bidding on 19,000,000 cu-

bic yards. Yardage to be moved on old contracts totals 4,400,000 cubic yards as previously mentioned. It is probable that permeable dikes and bank revetment work will call for 69,800 lineal feet of Permeable Pile Dike, 96,900 lineal feet of Bank Revetment.

St. Louis District expects to let some 8,800,000 cubic yards of levee work on the Illinois River in 1932 and will probably construct a total of approximately 7,700 lineal feet bank revetment along the Mississippi and Missouri Rivers. There must be moved in addition the carry over in levee work from 1931 amounting to 230,000 cubic yards on existing contracts.

The Rock Island District expects to let some 165,000 cubic yards of levee work in 1932. There must be moved, in addition the carry over in levee work from 1931 amounting to 1,606,268 cubic yards on existing contracts. There will be approximately 1,000 linear feet of bank revetted by hired labor.

Looking across the borrow pit on the work of H. E. Culbertson Company of Cleveland. A Bucyrus-Erie D-2 dragline with Atlas Imperial Diesel engine finishes up, thus speeding up the tower production.

Bonds Sold at Discount Still Purchase More

ALTHOUGH bonds for public improvements occasionally must be sold below par, present low construction prices, which give the dollar greater value, make it desirable to sell bonds even at a discount.

Recently in St. Louis County, Missouri, $1,500,000 worth of bonds were sold for $27,750 below par. But, according to the county engineer, the money received from the bond sale will still build more pavement than was planned when the bond issue program was adopted. Concrete pavement is now being built at costs which make the present dollar worth $1.60 as compared to its purchasing power of two years ago.

Numerous cases have come to light throughout the country where communities have failed to market bonds because of the low bond market, without consideration of the prevalent bargain prices in construction. Investors are looking for and getting bargains and it is to be expected, without any reflection on the character of the community, that bond prices should be enough lower to yield a comparative return to the investor.

However, as shown in St. Louis County, the lessened return from the bond sale is but a drop in the bucket as related to the dollar's greater purchasing power. The bonds were sold in that case at a discount of one and a half per cent, whereas, the dollars obtained will buy sixty per cent more than formerly. It is the taxpayer who therefore reaps the largest return on needed public improvements made at this time.

Shovel used as Piledriver

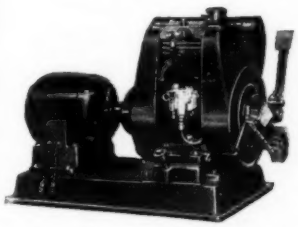
EXCAVATING contractor Roy M. Wright of Springfield, Massachusetts, has recently completed the foundation job for a water treatment plant for the Town of Chicopee, Massachusetts. Mr. Wright did the entire job with his Bucyrus-

Erie B-2 shovel. After completing the excavating he converted the machine to a pile driver using the interesting rigging shown in the illustrations. Mr. Wright tells us that the boom extension (his own idea) worked out very successfully. He used a Number 2 Vulcan Steam Hammer weighing four tons and drove 58 tons of steel sheet piling and 14,000 feet of timber piles with this rig. The illustrations are probably self-explanatory of the arrangement though we may add that the crowder was used for the pile line. Mr. Wright drove an average of 70 piles, 25 feet in length per 8½-hour day.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

Two Small Light Plants

TWO small models of electric light plants have been announced by *D. W. Onan & Sons, 50 Royalston Av., Minneapolis, Minn.* These are a 110 volt or 32 volt, 300 watt direct current plant to be sold at $99—and an alternating current model of 300 watt capacity to sell for $148.



The D. C. electric plant furnishes 110 volt without battery or 32 volt current used with battery. Supplies bright, steady light and power for any kind of electric appliance, up to their capacity. These will operate ¼ H.P. motor, such as those used on washing machines, water pumps, appliances for domestic purposes and current sufficient for operating many electric tools. The alternating current plants are built to furnish 110 volt, 60 cycle current, the same as supplied by city lines and will operate the A. C. radio and other alternating current appliances up to their capacity.

The engines used on these are four cycle, one cylinder, 2¼" bore and 2¼" stroke, air cooled, and fitted with complete circulating oil systems, large reservoir and return bearing ducts for constant running. These units are provided with suitable gasoline tanks for operating 10 to 12 hours on a filling and the production of electricity for their capacity will run from 8 to 10 hours on a single gallon of gasoline.

The generators are of high grade construction fitted with waste packed bearings. The generator and engine are connected with a flicker removing coupling which gives the same smooth light from a single cylinder operation as would be gotten from multiple cylinder units.

These can be set in any convenient place, started and put in operation without the necessity of bolting them to a permanent base of any kind. The voltage is regulated by an automatic governor at the carburetor, and the lights remain constant regardless of the load that is being used. When writing to the manufacturer for further information, please mention *Excavating Engineer.*

Small Lathe

EXTENDING its line in the small shop field, the *South Bend Lathe Works, South Bend, Indiana,* recently placed on the market a new 8 inch Junior back geared screw cutting lathe for general purpose use. This unit is a precision lathe said by the manufacturers to be capable of performing the most accurate work. Available in countershaft and individual motor drive, the lathe is built with a back-geared headstock with three step cone providing six changes of spindle speeds—three direct for light machining at high speeds and three back-geared for heavier work and slow speeds.

Among the mechanical features pointed out are: hollow spindle of alloy steel, Acme precision lead-screw of ¾ inch diameter; automatic longitudinal feed to carriage; tailstock set-over for taper turning; screw thread chart by which threads may be cut from 4 to 40 per inch.

Bed lengths supplied are 24 in., 30 in., 36 in. and 42 in. All types of turning, facing, boring, chucking, drilling, tapping, tapering, reaming, grinding, polishing, etc., may be done with this lathe and attachments are available for special work, if desired. Motor driven lathes are equipped with 1800 R.P.M. motor, belts, etc., and come ready to run as soon as connected with an electric lamp socket. For further information write the manufacturer, mentioning *Excavating Engineer,* please.

Motor Roller

THE accompanying illustration shows the recently announced Galion Master 4-cylinder Motor Roller, manufactured by *Galion Iron Works, Galion, Ohio.* It is powered with an Allis-Chalmers Model K engine—the same model motor used in the A-C Model E wheel-type tractor and in the "35" crawler tractor. For further information write the manufacturers.

Light Weight Features New Electric Hammer

A NEW electric hammer weighing only nine pounds is now being offered to industry through distributors by The United States Electric Tool Company.

The light weight is made possible by operating the hammer through a special flexible shaft attachment connected with any light type half-inch electric drill. In addition to the large decrease in weight for a hammer of this capacity, it is claimed that the flexible shaft also prolongs the life of the tool by absorbing the destructive jarring otherwise imposed on the power unit.

Specifications claim 4000 blows per minute up to one inch, finest Swedish steel in the hammer member, and high-grade ball and roller bearings throughout. Greater ease of handling is included among the new advantages. Full particulars can be had by writing to *The United States Electric Tool Company,* Dept. 98, 2490 West Sixth Street, Cincinnati.

You Can Depend on
"HERCULES"
RED-STRAND
REG. U. S. PAT. OFF.
WIRE ROPE
THERE are definite reasons why this wire rope is so dependable and long lasting, some of which are:
(1) It is made of acid open-hearth steel wire.
(2) Every wire put into it is first rigidly tested by us to make sure that it meets our exacting requirements.
(3) Our manufacturing methods and machines insure even tension on both the wires and the strands.
(4) It is made in both Round Strand and Patent Flattened Strand constructions.
Please feel free to ask for catalogs and further particulars.
Made Only By
A. Leschen & Sons Rope Co.
5909 Kennerly Avenue
ST. LOUIS, MO.
New York - Chicago
San Francisco
Denver
1857 - 1932
75th
ANNIVERSARY
A. LESCHEN & SONS
ROPE CO.

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

SHOTS FROM THE FIRING LINE

Labor Paid $910 of Each $1,000 Received By Contractor for Concrete Paving

By E. E. DUFFY

LABOR gets $910, or about nine-tenths, of every $1,000 received by the contractor in building a concrete pavement, according to a statement issued by Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, in testifying recently at the hearings of the Senate Committee on Appropriations.

"This is due to the fact that there are no intrinsically valuable materials used in road building," Mr. MacDonald explained.

Of the $1,000 given to the contractor $141 is spent directly by him for labor on the job: $45 is spent for labor by him in getting on the job and for other miscellaneous items. Mills and quarries and other agencies supplying the contractor receive $814 of which $724 is distributed to labor.

Universal Atlas Extends Safety Record

"ALTHOUGH Leap Year caused February to have an extra day, this fact did not spoil the perfect record of no lost-time accidents by the thousands of workers in all thirteen mills of the Universal Atlas Cement company," announced B. F. Affleck, president of the company, a subsidiary of the United States Steel corporation.

"Even more noteworthy," he said, "is the fact that three plants have each come through their fourteenth consecutive month without a single lost-time accident." These plants, located at Northampton, Pennsylvania; Leeds, Alabama; and Independence, Kansas, will receive trophies from the Portland Cement association for their perfect annual records made in 1931. Plans are now being made for formal presentation of the trophies.

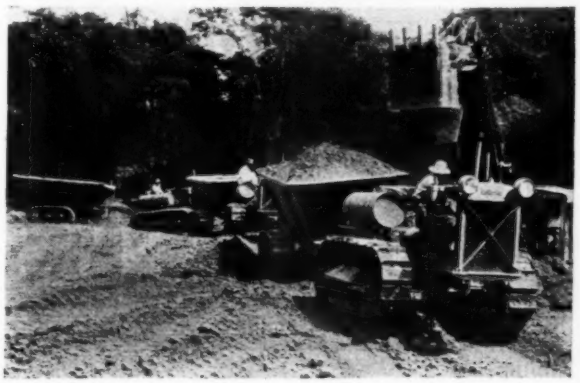
"Three things are responsible for the achievement of these records," said Gordon C. Huth, safety director of the Universal Atlas company. "First, modern safety equipment is installed wherever needed to protect workers. Second, thorough responsibility is assumed by operating officials and supervisory forces. And, finally, intelligent co-operation is given by every member of the organization."

Emergency Federal Help for Highways

EMERGENCY Highway Legislation Bill HR 9642 calling for appropriations to the extent of $120,000,000 for highways and $12,500,000 for forest roads, Indian reservations and etc., having passed the House was referred to the committee on Post Offices and Post Roads. There a few amendments were added, one including an increase of approximately $4,000,000. This bill was reported out of Senate Committee for favorable action and as we go to press it awaits its turn in the Senate.

Unless the bill passes, several states will not be able to take up the available Federal Aid money and the effect that this action will have upon the states, counties and municipalities may have a general tendency to influence the reduction of highway appropriations. If the bill becomes a law it will have a very satisfactory effect upon states, counties and cities and will add at least $170,000,000 directly to the highway program.

Panama Notes



The above picture was taken in February down on the Madden Dam project, Panama Canal zone but it doesn't look as though anyone down there had to "button up their overcoats." This project represents a three year contract and when complete will create a reserve supply of water equal to the quantity now confined in Gatum Lake. The work is being handled by **W. E. Callahan Construction Company and Peterson Shirley and Gunther.** Caterpillar tractors and LaPlant-Choate wagons are hauling from the Thew shovel.

Nova Scotia Notes

By J. P. McCLOSKEY

Operations are moving right along on the new pier job at Halifax judging from J. M. Willcox's recent letter. **Mr. Willcox** is operator on the **J. P. Porter and Son's** GA-2. He had some nice things to say about the GA-2's performance.

"We are digging in the railroad cut and there's plenty of frozen mud and rock. The GA-2 is running two ten-hour shifts—she sure knows her business and is the fastest little machine on cats."

We are glad to hear from Operator Willcox and to know that everything is going along first rate.

British Columbia Notes

The accompanying view shows the B-3 air operated tunnel shovel owned by the **Northern Construction Company & J. W. Stewart** at work on the Canadian Pacific railroad tunnel under the city of Vancouver. A. MacDonald is superintendent on this job which consists of sandstone and shale and N. D. Lambert is General Superintendent.

Judge: "What were you doing in that joint when it was raided?"

Locksmith: "I was making a bolt for the door."

GREDAG

LUBRICANTS

INSURED LUBRICATION IS ESSENTIAL TO MAXIMUM ECONOMY IN OPERATION

GREDAG is manufactured from the highest quality of grease lubricants. These are thoroughly blended with PURE Acheson electric furnace graphite which positively prevents metallic contact between bearing surfaces.

The remarkable affinity of this graphite for grease and oil permanently maintains a pressure, heat and water resisting film of lubrication. This film prevents rust and corrosion on exposed equipment and effects maximum economy in the lubrication and maintenance of outdoor equipment.

GREDAG

INSURES LUBRICATION

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division
CLEVELAND, OHIO
Unit of Union Carbide UCC and Carbon Corporation

Branch Sales Offices
NEW YORK PITTSBURGH CHICAGO SAN FRANCISCO

Shots From the Firing Line — Continued

New England Notes

By B. C. McCOWAN

The accompanying illustration shows a Bucyrus-Erie 32-B gasoline shovel owned by the C. W. Blakeslee and Son, Inc., excavating at Newton, Connecticut for the Fairfax State Hospital. The work consists of basement and heating tunnel excavating. There was plenty of clay encountered but the 32-B gobbled it up in short order.

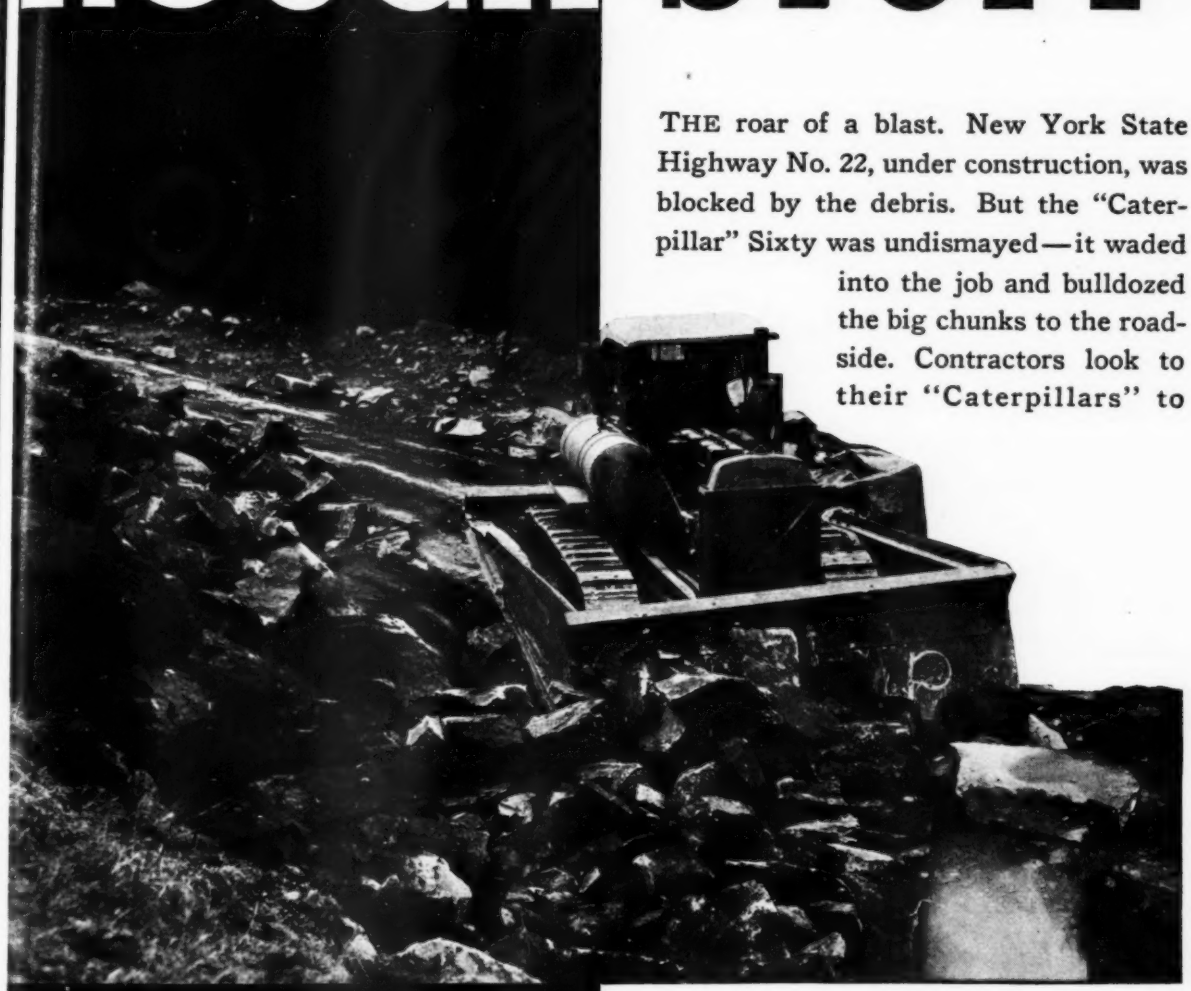
Tough digging with plenty of boulders was the daily diet for the Bucyrus-Erie 42B steamer and the Gas+Air on this state highway job near Millbury, Massachusetts. In the top view the 42-B owned by the A. I. Savin Company, Hartford, Connecticut who have the contract, is loading to a Sterling truck. Louis Williams is operating the shovel.

The large boulders seen along the roadside in the lower picture were moved by the Gas+Air owned by Herbert W. Wright of Worcester, Massachusetts. Mr. Wright is shown at the levers loading to White truck.

"How bashful you are," a pretty girl said to a young man.
"Yes, I take after father in that respect," he said.
"Was your father bashful?"
"Was he? Why, mother says if father hadn't been so darn bashful I'd be four years older."

For your convenience in writing to National Carbon Company, Inc. you will find a card bound in this issue.

ROUGH STUFF



THE roar of a blast. New York State Highway No. 22, under construction, was blocked by the debris. But the "Caterpillar" Sixty was undismayed—it waded into the job and bulldozed the big chunks to the roadside. Contractors look to their "Caterpillars" to tackle any phase of the work—the same tractor will push a bulldozer one day, pull a scarifier the next, haul wagons on a third. Endlessly useful—"Caterpillars" conquer bad weather and rough stuff.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

Prices—f. o. b. Peoria, Illinois

TEN	$1100	THIRTY-FIVE	$2675
FIFTEEN	$1450	FIFTY	$3675
TWENTY-FIVE	$1900	SIXTY	$4175
THIRTY	$2375	SIXTY-FIVE	$4350

CATERPILLAR

REG. U. S. PAT. OFF.

TRACTOR

For your convenience in writing to Caterpillar Tractor Co., you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

New York Notes

The New York Public Service Commission has approved as not excessive the bid submitted by the **Bates and Rogers Construction Company**, Cleveland, for the elimination of the Erie Railroad grade grossing on the Warsaw-Gainesville state highway just south of Rock Glen station, Gainesville.

The commission has also approved a revised estimate of total cost, exclusive of land and damages, for the elimination of the Liberty street crossings of the Erie, Delaware, Lackawanna & Western and Delaware & Hudson in Binghamton, for which the **Hecker-Moon Company**, Cleveland is the general contractor.

Approval has also been given by the commission to plans and cost estimates for elimination fo the Whitcomb and Oquaga crossings of the Erie, located on the Friendship-Belmont state highway east of Belvidere station, Amity, and on the McClure-Oquaga Lake road, near Deposit. Proceedings for the elimination of the Sinpatch crossing of the New York Central, near Wassaic, and of the Howells, Howells Center and Howells Lower crossing of the Erie, all located in Wallkill, have been closed by the commission.

Buffalo and Vicinity

By D. E. WHITE

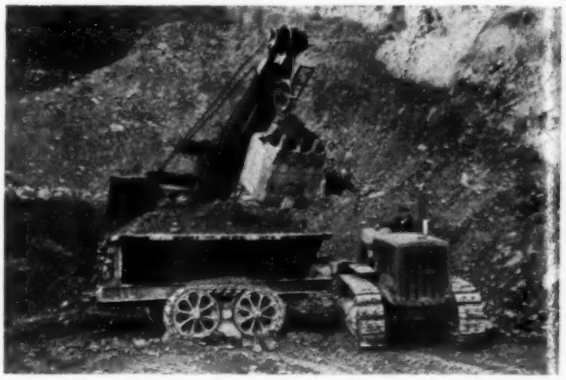
ROBERT G. SCOTT

We regret to learn of the death on February 7th of Robert G. Scott of Scott Brothers, well-known New York State contractors. We extend our sincere sympathy to Mr. Scott's family.

D. J. Newman of Buffalo, and member of New York Local 125 of the New York City H. & P. Engineers, has made application to the U. S. Patent office for patents on an automatic service safety brake to be used on power shovels, cranes and hoisting engines.

Eastern Pennsylvania Notes

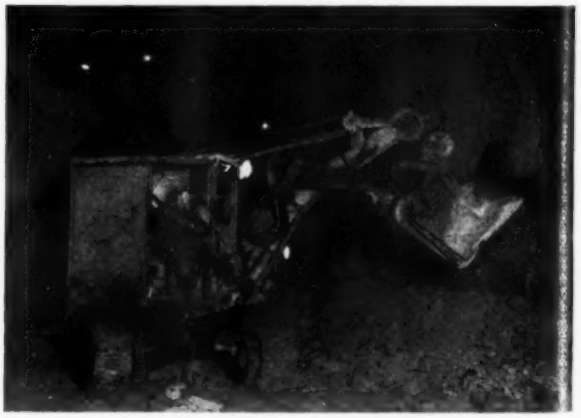
By M. G. CONWAY



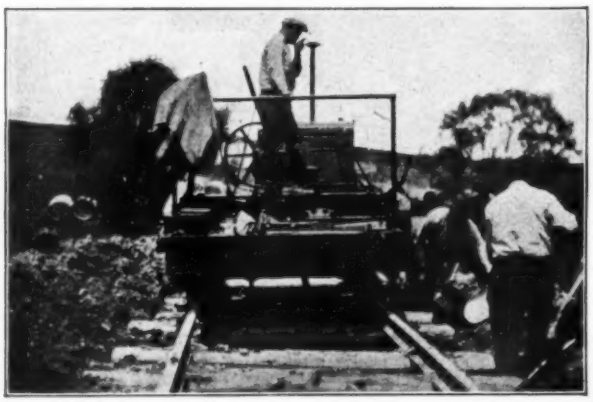
This "Caterpillar" Fifty and LaPlant-Choate 7-yard bottom dump wagon are hauling from a Bucyrus-Erie Gas-Air shovel on the stripping operations of **C. W. Wagner & Sons** at Larksville, Pennsylvania. They are removing 64' of overburden at the rate of 16 loads (100 yards) per hour, to reach an 18' layer of coal.

At the Oak Hill Colliery near Minersville **J. Robert Bazley, Inc.**, are using the above 43-B for Anthracite stripping consisting of rock and clay.

Virginia Notes



On the C. & O. Road tunnel at Tuckahoe, Virginia this 1030 tunnel shovel owned by the **Walton Construction Company** loads from 45 to 50 six-yard cars per day of ten hours.



A Machine for Shifting and Raising Your Track

If you are operating a quarry or open pit mine, engaged in a construction job where track must be raised and shifted frequently, here is a money saving investment. It is no longer necessary to maintain a large labor gang for this work. No longer need there be delays to your other operations. This machine and a few men will do the work, saving you time and money. If you shift or raise track, you need this machine.

NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED TRACK SHIFTER

For your convenience in writing to Nordberg Mfg. Co. you will find a card bound in this issue.

Is there a WIRE ROPE *Cure-all*?

There are many types of wire rope and a wide variety of wire rope constructions. These have been developed over a long period of years to satisfy diverse requirements.

In the case of Roebling, many years have been spent in the development and improvement of rope design and production —in searching out the truth regarding wire rope performance —in an organized endeavor to give the rope user more for his rope dollar. As a part of this program, every type and construction of wire rope has been and constantly is being exhaustively studied in laboratory and field to determine its qualities and proper application, and to seek improvements.

Out of this effort has come, for one thing, the conviction that no one type or construction of wire rope is suitable for all purposes—that there is no wire rope "cure-all".

You will find, therefore, that Roebling does not favor any one kind of rope. It endeavors to, and because of its complete line, is free to recommend exactly the rope that most economically will meet the user's needs.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
Wire · Wire Rope · Copper & Insulated Wires & Cables · Welding Wire · Flat Wire · Wire Cloth & Wire Netting
Branches in Principal Cities Export Dept.—New York, N. Y.

A plain statement about Wire Rope Economy

Roebling does not indulge in nor encourage sweeping claims of superior wire rope economy. Such claims, if generally made, would merely confuse the rope user. ¶ For the guidance of rope buyers, however, Roebling does assert that when gauged by the work performed, NO wire rope, regardless of make or construction, will show lower general average operating costs than Roebling.

Wire Rope for all purposes

Roebling makes wire rope of a great variety of types and constructions, and therefore can supply a wire rope exactly suited to each particular requirement. ¶ The great stamina of all Roebling Ropes is primarily due to the quality of Roebling Wire. This Acid Steel Wire is renowned for its fatigue and wearing qualities. No better rope wire is produced. ¶ "BLUE CENTER" STEEL is the highest grade and is generally recommended for severe duty.

JOHN A. ROEBLING'S SONS COMPANY

For your convenience in writing to John A. Roebling's Sons Company, you will find a card bound in this issue.

AMERICAN
STEEL & WIRE COMPANY
WIRE ROPE

ON shovels—on derricks—brute force is necessary to loosen and load rock—mighty strength is essential to raise it out of the hole. Truly—here are daily tasks to test wire rope performance to the utmost. To keep equipment on the job—to eliminate costly replacements and assure lower operating costs—most users specify American Steel & Wire Company American Wire Rope. Experience has proved its superiority—the service back of it is a valuable asset.

1831 MORE THAN 100 YEARS of PROGRESS in WIRE MAKING 1932

AMERICAN STEEL & WIRE COMPANY
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
208 South La Salle Street, Chicago And All Principal Cities
Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco
Export Distributors: United States Steel Products Company, New York

Shots From the Firing Line — *Continued*

Pittsburgh and Vicinity

By J. S. WEAVER

Bids have been called for the construction of the Montgomery Island lock project, 31.6 miles below Pittsburgh on the Ohio River. Proposals on the $3,000,000 project must be in the hands of the United States Engineer, Keenan Building, Pittsburgh, by 12 o'clock noon, April 22.

The work consists of the construction of two locks on the left bank of the river, the inner lock 110 feet by 600 feet and the outer one 56 feet by 360 feet. The lock walls are 72 feet in height and the land wall 1,936 feet in length.

Word has been received from Harrisburg to the effect that **Governor Pinchot has approved** State Highway Department plans for the construction of a total of 16.95 miles of concrete highway in Washington and Green Counties on the Federal-aid program for this year. One project is in Washington County and two in Greene. The roads are to be reinforced concrete and 18 feet in width. Plans for starting work on these roads as soon as the weather permits are practically completed and when work opens up they will be pushed to rapid completion.

Two important Erie County highways will be paved this year, Governor Gifford Pinchot announced this week at Harrisburg. New York state line and the Roosevelt Highway from Mill Village to Union City, are included in the 1932 program. The Lake Road improvement is approximately 10½ miles and the Roosevelt Highway project is slightly over five miles long.

The extension of the Mt. Washington Boulevard from the Liberty Tubes to connect with the approaches of South Tenth Street is being revived by City Council. A conference with Department of Public Works' engineers will be held in the near future and it is expected that the $600,000 roadway and viaduct job will get final authorization.

Bids for the construction of about 11 miles on the Coolspring Road, Route 63, will be asked immediately and work is expected to start about April 1st, county commissioners report. The commissioners met with Mr. Stone, district engineer of the Department of Highways, in Punxsutawney recently and completed arrangements.

Geo. N. and O. J. Yoho of Cameron, West Virginia, expect to complete their West Virginia State Highway Route 73, within the next few weeks. This was one of the largest contracts awarded by the State in 1931 and was completed in record time.

She was working on some tiny garments when he came home. "Why, Mary," he said, "I didn't know." At first she looked puzzled and then with a smile said, "Don't worry, Jim, it isn't that. I'm just making some new seat covers for our new Austin."

Indiana Notes

The State Highway Commission is expected to open bids the first week in April for another 100 miles of the 1932 highway construction program.

The American Aggregates Corporation of Greenville, Ohio, has bought the holdings of the Million & Son Company at Lake Cicott, Indiana. The new owners will continue to operate both the sand pit and the gravel pit as orders are received for material. Frank Million has been employed by the American Aggregates Corporation as salesman operating from Logansport.

The Board of Public Works will ask the Indianapolis City Council to approve a bond issue of $100,000 for completion of the widening of East New York street and other street work during 1932.

Illinois Notes

Bids were opened at Chicago March 18th in the War Department office for construction of new **million-dollar dam** at Marseilles, Illinois as a part of the waterway program. The proposed dam will require 25,000 cubic yards of concrete, 2,000,000 pounds of reinforcing steel, 60,000 yards of

For your convenience in writing to American Steel & Wire Company you will find a card bound in this issue.

Shallow Grading

PUTTING a heavy excavation tool in to take out a 6-inch cut runs the cost 'way up. That was before the Haiss Excavator came along to demonstrate how easy it is to put light excavation on a profitable basis.

Now, 14 to 20c a yard, placed in the truck is a fair estimate of shallow grading cost, including 6 to 10c. a yard depreciation (both are too high) on the machine. These are not theoretical figures, but are averaged from costs reported on representative jobs in different localities.

You can make money with a Haiss Excavator. Get acquainted with the work it has done—see Bulletin 530.

GEORGE HAISS MANUFACTURING CO., INC. 144th St. & Park Ave., New York, N.Y.

H-759

HAISS EXCAVATOR

"IT DIGS"

Also: HAISS "50", "27" and "80" BUCKET LOADERS—PORTABLE BELT CONVEYORS—CLAMSHELL BUCKETS

For your convenience in writing to George Haiss Manufacturing Co., Inc., you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

dirt excavation and 65,000 cubic yards of rock excavation. Bids for dredging the Dresden Heights pool between Dresden and Brandon road were opened March 25th. This project involves the removal of 428,000 cubic yards of earth and 192,000 cubic yards of rock from the waterway channel. Bids for clearing 104 acres of land in the Dresden Heights and Brandon Road pool were opened March 14th. This entire project is to be completed by October.

The Sangamon County Board of Supervisors has made possible the construction of 12 miles of state road this year in the southern part of this county by the expenditure of $13,500 for right-of-way which the townships affected are financially unable to buy. The estimated expenditure of the state on this project is $259,000. This precedent in the purchase of right-of-way is justified by unemployment conditions, Walter E. Lindgren, chairman of the road and bridge committee, asserted.

The State Highway Department has started negotiations with many cities toward carrying out plans for expenditures of $4,000,000 this year in city street paving and widening.

Madison county will have **$137,870.01 available for road construction** this year. This whole sum has already been appropriated to specific roads as follows: $100,000 for the Edwardsville to Marine road and $25,000 for mile of road in Wood River township.

The Wills Construction Company of St. Louis bid $45,073 to be low on the west levee of Project 12 in East Side levee and sanitary district, including 137,000 cubic yard earth fill. Keeley Brothers Contracting Company of East St. Louis was second with $50,690.

The Huffman Construction Company of Cleveland had low bid of $886,500 on the dredging of the Marseilles pool of the Great Lakes to-the-gulf waterway. The bids were opened in Chicago March 15th by war department engineers. The pool is 24 miles long; and 1,954,000 cubic yards of earth and 323,000 cubic yards of rock must be excavated within the next calendar year.

A contract has been awarded the **Walsh Construction Company** for grading work incident to the extension of the New York, Chicago & St. Louis yard at 103rd Street, Chicago.

Minnesota Notes

Heavy rock cuts and very deep fills are plentiful on the **Nolan Brothers** job near Winona, Minnesota. Here we see one of the heavy cuts where they are using a Northwest to load to Athey 3-way dumps hauled by Caterpillar 60's .

A contractor over at the new library was telling about sending one of his hired help out to borrow a winch from another contractor and this hired help came back three hours later with a truck full of "wimmin" and innocently said: "I brought along several so you could pick out one."

A Dollar Saved is a Dollar Earned

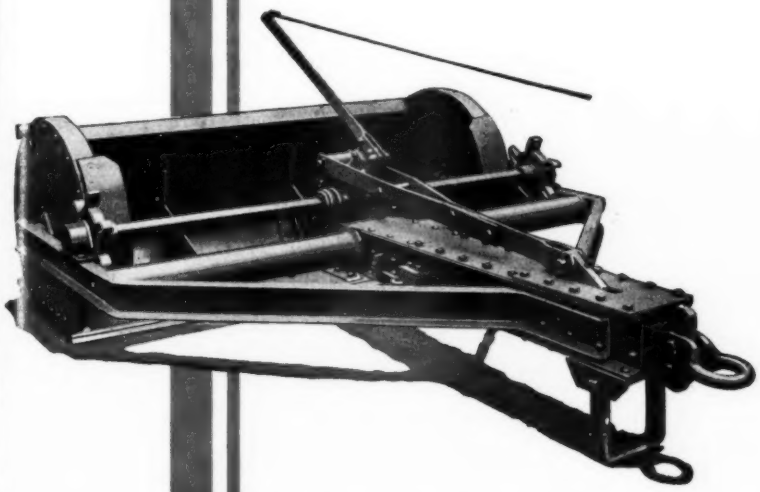
You can be sure of the greatest possible savings when your machine is equipped with

BECO-BLOCKS

These improved friction blocks are built to stand up under the greater speeds and heavier loads of modern excavating machinery. Beco-Blocks will out-last several sets of wood blocks, and will give your operator more accurate control.

BUCYRUS-ERIE COMPANY
SPECIALTY DEPARTMENT
South Milwaukee - - Wisconsin

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.



PUT YOUR BIG TRACTOR IN FRONT OF A WESTERN NO. 60

YOU will be surprised at the efficiency of your new earth moving unit. One man, one 60 or 75 H. P. crawler tractor, and a Western No. 60 Rotary Fresno will move two or more cubic yards of material each trip.

The Western No. 60 is a one man **cut and carry** tool. It is automatic in operation. The tractor driver pulls the trip rope and the pan revolves to cutting position. When the pan is loaded the bit automatically comes out of the ground. At the dump another pull on the trip rope and the load is dumped and spread.

There is a Western Rotary Fresno for any sized tractor you have available. The entire line is described in Bulletin 31-AK. Write for a copy.

On the New Dunes Relief Highway near Michigan City, Ind., a Western No. 60 Rotary Fresno dumping and spreading its load.

WESTERN WHEELED SCRAPER COMPANY
AURORA, ILLINOIS, U. S. A.

WESTERN

For your convenience in writing to Western Wheeled Scraper Company, you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

St. Louis and Vicinity

By A. J. KOENIG

At the **Missouri State highway letting** held at Jefferson City on March 11th, 929 bids were received on approximately $3,500,000 of roads. The 72 projects for which bids were received involve 25.9 miles of graded earth, 104.3 miles of graveled surface roads and 106.2 miles of 20-foot concrete pavement.

The low bidders were announced as follows: concrete pavement: 10,426 miles, Cole county to **Kelly & Underwood**, Granby, $100,097.; 18 miles, six sections in Jefferson and Franklin counties to **Davis Construction Company**, Boonville, $306,285.; 8.67 miles in Greene county to **Kelly & Underwood**, $152,709.; 10,288 miles in Pike county, $123,539 to **Joseph Kesl**, Edwardsville, Illinois, 17.03 miles, 4 section in Audrain county, $190,627 to **Cameron-Joyce Company**, Keokuk, Iowa; 15.7 miles in Lafayette county, five sections, $185,664 to **Deering & Davidson**, St. Louis; 7.2 miles, Macon county, $69,620 to **C. H. Atkinson**, Watertown, S. D.; 5.162 miles, St. Louis county $149,458, to **Sandy Hites Company**, Kansas City; 12.98 miles Miller county, Alt. No. 1, **Harrison Engineering Company**, Kansas City; Alt. No. 2, **Bridges Asphalt Company**, St. Louis; Alt. No. 3, **Nolan Bros.**, Minneapolis, Minnesota; 2.67 miles grading, Schuyler county, **C. H. Atkinson Paving Company**; 7.8 miles grading, Cass county to **M. E. Gillioz**, Monett, Missouri; 8.84 miles grading, Holt county **Dan Sherrer**, Kansas City, Kansas; 1.863 miles grading Andrew county, **Nevada Construction Company**, Nevada, Missouri; 4.735 miles grading, Barton county, **O. O. Fuller Construction Company**, Nevada, Missouri; 4.537 miles gravel, Dent county, **M. E. Gillioz**, $35,447; .0.627 miles gravel and 10-foot concrete New Madrid county, **Joseph Kesl & Sons.**

Gravel: 8,537 miles Chariton county, $5,860, **Fellin Bros.**, Marshfield, Missouri; 4.030 miles Dunklin county, $10,919, 4.038 miles Stoddard county, $14,587 and 6.299 miles Bollinger county $54,091 to **Bunnell & Mack**, Paragould, Arkansas; 8.949 miles Mississippi county, $4,920, **Richmond Construction Company**, Advance, Missouri; 5.408 miles Montgomery county, $24,310, 2.306 miles, Pemiscot county, $6,929, 5.188 miles Audrain county, $9,474, and 7.824 miles Boone county, $33,220, **Martin Wunderlich**, Jefferson City, Missouri; 7.286 miles Barry county, $4,283, and 2.920 miles Pulaski county, $13,687, **M. E. Gillioz**; 4.280 miles Adair county, $16,255, **A. C. Longfield**, LaPlata, Missouri; 2.553 miles Camden county, $16,485, **A. E. Keith Construction Company**, Kansas City; 0.348 miles Carter county, $11,678, **Jos. Kesl & Sons**; 7.455 miles, Pemiscot county, $23,682 **R. B. Potashnick**, Cape Girardeau, Missouri; 12.487 miles Phelps county, $7,348, **Neyer Construction Company**, Billings, Missouri; 4.024 miles Putnam county, $11,799, **Jos. L. Pohl**, Nevada, Missouri; 3.786 miles Ste. Genevieve county, $23,260, **E. K. Porter**, Carrollton, Missouri; 3,945 miles Sullivan county, $30,412, **Carson-Cuddy Construction Company**, Brunswick, Missouri.

The Acker Bill appropriating $311,592 gas tax funds to pay contractors who did state highway work under the now-invalid prevailing wage law was signed by Gov. Emmerson of Illinois. Contractors will get their money soon.

Louis Rich Construction Company, East St. Louis, made a low bid of $113,553 on three sections of pavement totaling 9.16 miles in Bond county, Illinois.

The low bid for the construction of the DeBaliviere Avenue sewer, St. Louis, was submitted by **J. J. Gilmore** of Chicago. **Ansbro & Maguire** were low with a bid of $15,612 for the construction of the South Harlem Creek public sewer.

Out on the **Davis Construction Company's** job on the new Jackson County road about 15 miles from Kansas City the above Koehring shovel loads this 12-yard LeTourneau chariot-type dump cart drawn by the new Caterpillar 60 Diesel. Davis Construction Company headquarters are at Boonville, Missouri.

Dungey & Cochran, Marion, Illinois, was low bidder for the construction of 15.75 miles of pavement on routes 121 and 122 in Logan and Tazewell counties, Illinois. Their bid was $276,443.

R. G. Aldridge was low bidder for 8.494 miles of grading at $72,523 in Marshall county, Kansas. **List & Clark**, Kansas City were the successful bidders with a bid of $51,722 for grading and drainage structures on 12 miles of highway in McPherson county, Kansas.

Kansas Notes

The Interstate Commerce Commission has authorized Arkansas Valley Interurban to construct in Hutchinson an extension two miles long and to cost about $75,000.

Oklahoma Notes

By PAUL W. ROBINSON

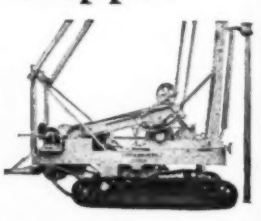
Building Oklahoma's first elevated railroad developed an unusual double project by which the contractor built the fill for the elevated and changed a river channel simultaneously, using the same equipment and getting pay for both.

When the city decided to straighten the channel on the Canadian river at Oklahoma City, **Leo Saunders**, city contractor was awarded the work. He had previously secured the contract for the fill for the elevated about two hundred yards from the river. Saunders built a boat equipped with

Loomis "Clipper"
FULL LENGTH
CRAWLER DRILL

Time saved by quick moving can be utilized to give you more and cheaper footage.

Size 44 "Clipper" comes equipped with steel frame; steel or wooden mast, wire or manila line.



WRITE FOR FULL INFORMATION.

Established 1842

THE LOOMIS MACHINE CO., K STREET TIFFIN, OHIO

MEETING PLACE OF CAPITAL AND LABOR

THE KOENIG LABOR AGENCIES

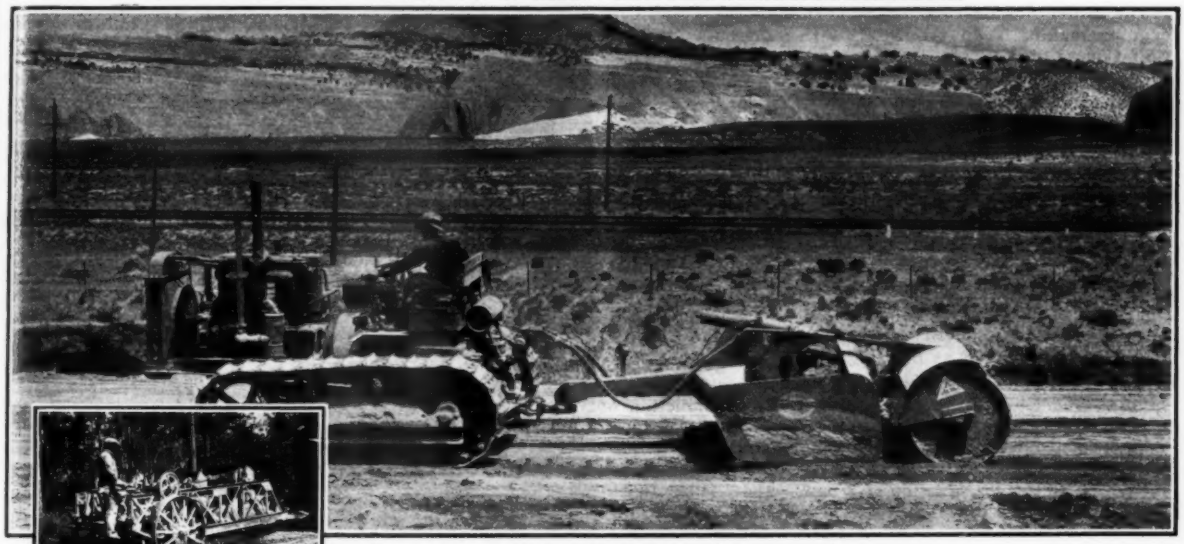
Established 1875

ST. LOUIS
612 Walnut Street
Main 2766 and 2767

KANSAS CITY
501 Delaware Street
Main 0796

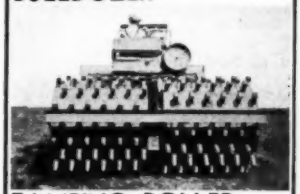
HELP OF ALL KINDS FURNISHED FREE

PUT YOUR DIRT MOVING AND GRADING COSTS **DOWN** WHERE THEY BELONG



WAGON GRADER

BULLDOZER



TAMPING ROLLER

SCARIFIER

The BLAW-KNOX (Ateco) HYDRAULIC DIRTMOVER

This impressive line-up of dirt moving machinery is breaking cost records everywhere.

Low in first cost---low in maintenance. Highly efficient--- Blaw-Knox Dirt Moving Equipment often pays for itself on the first job.

Let a Blaw-Knox dirt moving expert show you how costs can be lowered on your present contract. Give full details---a sketch will be helpful.

If you don't have a job at the present time, keep this page as a memorandum to write Blaw-Knox when you get one.

Get Blaw-Knox Catalog No. 1310.

Fill in and mail this coupon

BLAW-KNOX COMPANY, 2018 Farmers Bank Building
Pittsburgh, Pa.

Send me complete information about the Blaw-Knox (Ateco) Hydraulic Scraper and the complete line of Blaw-Knox (Ateco) Dirt Moving Equipment.

Name

Company

Street

City State

BLAW-KNOX

When writing to Blaw-Knox Company, please use coupon or card bound in this issue.

Shots From the Firing Line — *Continued*

electric driven sand pumps and, floating it in the river at the channel location, pumped sand through a twelve inch pipe line to the elevated roadway. To construct the shoulders and level the crown of the fill three Bucyrus-Erie clamshells were used.

By combining the two contracts, Saunders, with a home-made dredge, three Bucyrus-Erie machines and a handful of men, was able to move a maximum amount of dirt with a minimum amount of equipment and got paid at both ends of the line.

Southern Notes

By R. S. WELFER

The Miller Engineering Company of New York and Chicago is making good progress on the Augusta National Golf Course at Augusta, Georgia.

W. A. Todd is using a Type B-2 steam shovel at his gravel plant near Dunbarton, South Carolina.

L. D. Law of Gainesville, Georgia, reports good progress on his work near Greensboro and has now started his work in Taylor County.

E. M. Williams of Monroe, Georgia, has one highway project and a federal building under way.

J. M. Allen & Company, Chattanooga, are pleased with results obtained from a Bucyrus-Erie Type 1030 clamshell machine used on the Ringgold Road.

Friends of **Vader Roberts** will be interested to know he is operating a 42-B Bucyrus-Erie steam shovel for **Christie-Hutchinson & Burton** at Birmingham.

Gulf Development Company has been reported as planning to undertake in the near future, the construction of a new 75-mile railroad line to connect Andalusia, Alabama with Port Dixie, Florida. The proposed railroad is part of a larger project sponsored by the same company, which includes also the construction of a new seaport (Port Dixie) at a point 25 miles south the Crestview, Florida, and 40 miles east of Pensacola, on the shores of Choctawhatchee bay, a natural land-locked harbor opening into the Gulf of Mexico.

Plans for the construction of the port are understood to be nearing completion, while it has also been reported that a locating party will be started over the general route of the railway at once, to determine the right-of-way in preparation for the letting of a grading contract about May 1. That section of the new line from Port Dixie to a connection with the Louisville & Nashville west of Crestview will be surveyed and built first, to provide transportation for materials required in the port construction, while the 50-mile extension north to a junction with the L. & N. and the Central of Georgia at Anadalusia will be undertaken later. General Albert C. Dalton, U. S. A., retired, is president of the Gulf Development Company, which is incorporated in Delaware for $2,500,000, and Captain Mallie Martin, of Crestview, is in charge of the railway surveys and construction.

BUSINESS OPPORTUNITY.
An excellent opportunity to cut down handling costs is afforded any contractor who puts a Hayward Bucket to use. Address The Hayward Co., 52-54 Church St., New York, N. Y.
Hayward Buckets

By J. W. FORD

The operating crew of one of the Bucyrus-Erie Tower Excavators owned by **E. F. Powers Construction Company** and operating near Lake Village, Arkansas is shown in the above snap shot. For a complete account of the work E. F. Powers Construction Company has done in the Mississippi valley see Excavating Engineer for February, page 77.

Diner (in restaurant, after waiting 15 minutes for soup): "Waiter, have you ever been to the Zoo?"

Waiter: "No, sir."

Diner: "Well, you ought to go. You'd enjoy watching the tortoises whiz past."

"How did they treat you in Scotland?"

"Reluctantly."

Colorado Notes

By H. M. BIBAUD

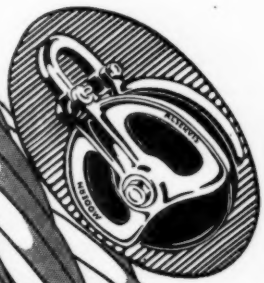
Under the new highway budget for 1932, more than ten thousand men will be employed in road building in Colorado this year. A large increase is provided in the amount originally scheduled for the federal aid project. $70,000 is included in the revised budget for the improvement of Highway No. 6, east of Montrose. More than 150 projects for the state have been planned.

Four states, Colorado, Wyoming, New Mexico, and Kansas, were represented at the **Hi-Way Engineering Conference** held at Boulder, January 14-15, under the auspices of the Department of Civil Engineering at the extension division of the University of Colorado. Road needs and methods of maintenance and construction were discussed from every angle during the conference.

The Durango Chamber of Commerce in its 1932 program of major activities has listed a number of road projects. It has planned the working out of these enterprises for the promotion of the interest of the city itself and the development of the industries of the San Juan valley. Among the

WILLIAMSPORT WIRE ROPE

Send for literature on our new line of MODERN BLOCKS built as blocks should have been built long ago.



Anytime-Anywhere stands the most gruelling tests

Send for literature today on our special constructions of wire rope for longer service and greater strength.

These constructions are recently developed for specific purposes and you may have an operation on which these ropes will give noticeably superior service and with much greater economy.

WILLIAMSPORT WIRE ROPE COMPANY

General Sales Office: Peoples Gas Building, CHICAGO

Main Office and Works: WILLIAMSPORT, PENNSYLVANIA

WILLIAMSPORT WIRE ROPE — PLOW STEEL

For your convenience in writing to Williamsport Wire Rope Company, you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

road projects listed are the construction of a good surfaced highway from Pagosa Springs, Colorado, to Chama, New Mexico; construction of Dove Creek-Shiprock road; improvements on Dove Creek-Durango to Silverton highway; completion of Aztec to Cedar Hill road; completion of Wolf Creek Pass, and the completion of Yellow Jacket.

The advantage of making highway surveys from airplanes was stressed by G. G. Lasseter, New Mexico engineer, at the meeting of highway engineers from the western states at Boulder, January 14. Mr. Lasseter stated that the method is a saving both in time and money, and gave for example the fact that more than $3,000 was saved in New Mexico by five aerial surveys, sixty per cent of the preliminary ground surveys were eliminated and the final location of roads speeded up.

J. O. Francisco, recently appointed supervisor of maintenance of state highways in southwestern Colorado, is now established in his offices in Durango.

The following road projects are included in the 1932 budget: Delta County, resurfacing, federal aid project on Road No. 6, $5,000; improvements at Crawford in the east, $2,000; improvements from Hotchkiss to Paonia, $3,000; in Montrose, improvements, Naturitato-Nucla, $2,000; Highway No. 6, from Montrose, east, will receive $70,000; federal aid and resurfacing on the Grand Junction-Fruita road, $52,000; Federal aid in La Plata, surfacing and grading two and a half miles of Road No. 450, $5,000; repairs to U. S. Highway No. 50, between Canon City and Salida, $40,000.

The expenditures for connecting links in cities and towns included Delta, Meeker, Street, $2,466, Montrose, East Main, $1,818, Durango, $1,800.

Nevada Notes

Dodge Brothers, Inc., of Fallon, with a bid of $14,297,80 were awarded the contract for reconstructing that portion of the State Highway System in Clark County, between Las Vegas and ten miles southeast and a bridge over the Las Vegas Wash.

Mahoney-Cline Company of Las Vegas was low bidder with $120,008.60 for reconstructing that portion of the State Highway System in Elko County, between Wells and East Foot of Pequops.

She was only a photographer's daughter, but, Oh Boy! she was well developed.

Washington Notes

By E. L. BOOTH

Working near Wilbur, about sixty-five miles west of Spokane, Max J. Kuney Company of Spokane is making excellent progress on their Sunset Highway job. The contract calls for approximately 110,000 cubic yards of Class "A" and 60,000 cubic yards of rock excavation. Their Bucyrus-Erie 37-B has been averaging about 1,500 cubic yards Class "A" per shift. President Max Kuney is highly pleased with the machine. The above illustration shows the 37-B working on a channel change loading to 5-yard trucks. Superintendent M. F. Coons is in charge of this work.

Clearing, grading, surfacing with crushed stone and draining about 4.5 miles of State Road No. 10, Entiat Ferry to Orondo, in Douglas County, involving about 42,250 cubic yards of excavation, 12,500 cubic yards of crushed stone, 705 lineal feet of pipe culverts and other items was awarded to E. P. Doolittle, Woodinville, for $29,799.00.

Oregon Notes

Earl L. McNutt of Eugene, with a bid of $92,006.50, was low bidder on the grading and surfacing of the Paradise Creek-Elkton section of the Umpqua Highway. The West unit consists of 3.84 miles of grading and the East unit of 4.18 miles of grading.

San Francisco and Vicinity

By J. H. SACKETT

Among the most interesting contracts awarded during the past month were the following:

Bent Brothers of Los Angeles were awarded the contract by the City of Pasadena, Los Angeles County, for Pine Canyon Dam on the San Gabriel River. Their bid price was $2,407,311.00.

Hemstreet & Bell of Marysville were awarded the contract by the Bureau of Public Roads, San Francisco, for four miles of grading in the Hoopa Valley Indian Reservation, Humboldt County. Their bid price was $126,708.00.

Basich Bros. Construction Co., Torrance, was awarded the contract by the State Division of Highways, Sacramento, California for 19.5 miles of grading, oil-treated surfacing and timber bridges in Riverside County from Shaver Summit to Desert Center. Bid was $528,678.00.

C. R. Butterfield, San Pedro, was awarded the contract by the California Division of Highways, Sacramento, for 0.8 miles of grading and concrete paving in San Diego County from Sorrento Creek to Del Mar. His bid was $66,218.00.

Bids will be received up until April 11 by the City Purchasing Agent at San Diego for the construction of the El Capitan Dam, spillway and outlet works. Dam is to be hydraulic fill-rock embankment type and is located on the San Diego River about 8 miles northeasterly from the town of Lakeside. Principal items are:

840,000 cu. yd. rock excavation and placing in dam
120,000 cu. yd. excavation and placing in embankment
1,350,000 cu. yd. excavation and hydraulic placing in dam
56,000 cu. yd. concrete all classes
56,000 barrels cement
2,128,000 lb. reinforcing steel
496,000 lb. structural steel
5,000 cu. ft. grout
Furnishing and installing outlet works.

The estimated cost of the El Capitan Dam is $3,230,000.00.

Los Angeles and Vicinity

By L. N. CLEVELAND

The above illustration shows J. P. Holland & Sons' Bucyrus-Erie 37-B operating on a state highway job in San Bernardino, California.

Mittry Brothers Construction Company of Los Angeles, formerly at 723-27 Detwiler Building announce the removal of their offices to their new home, located at 5531 Downey Road.

WIRE ROPE on a crane . . .

. . . . must be FLEXIBLE

Sheaves on a crane boom and clam shell are small and are frequently called upon to function at close centers. Unless the wire rope used is flexible to the utmost degree, excessive wear and short life must necessarily follow. When manufacturing wire rope for this service, Wickwire Spencer uses only stock which produces a rope of the maximum flexibility. Crane operators find that it minimizes rope maintenance because of longer life and less frequent rope changes.

Wickwire Spencer Steel Company
41 East 42nd Street, New York City; Buffalo; Chicago; Detroit; Philadelphia; Worcester; Tulsa, 314 E. Archer Street; Pacific Coast Headquarters: San Francisco; Branches and Warehouses: Los Angeles, Portland, Seattle. Export Sales Department, New York City. . . . .

Send for our book. It is free and will prove of great value.

WIRE ROPE *by Wickwire Spencer*

For your convenience in writing to Wickwire Spencer Steel Company, you will find a card bound in this issue.

BOOK REVIEWS

Excavating for Profit is the title of a profusely illustrated and attractively presented 56 page bulletin published by **Sauerman Bros., Inc., 474 S. Clinton Street, Chicago, Illinois.** This bulletin known as Catalog No. 12 describes and illustrates the Sauerman slack line cableway excavators and many installations are illustrated and diagramed to show the actual method of operation. In writing for a copy of this catalog please mention Excavating Engineer.

"Alcoa Aluminum and Its Alloys," has recently been published by **Aluminum Company of America** to meet the ever increasing demand for a ready reference book on aluminum and its alloys. The book gives in concise form information concerning the physical and chemical properties of the aluminum alloys produced by Aluminum Company of America. In addition to this, the book contains tables showing the sizes of the basic commodities the company manufactures from these alloys. The commercial tolerances for the various commodities are also given. Copies may be secured by writing the Aluminum Company of America, Pittsburgh, Pennsylvania.

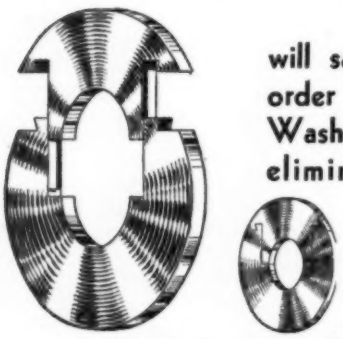
Information Circular 6582, "Sand and Gravel Dredging Methods and Costs of J. K. Davison and Bros., Pittsburgh," may be obtained free from the **U. S. Bureau of Mines,** Department of Commerce, Washington, D. C.

The American Rolling Mill Company of Middletown, Ohio recently published an engineering bulletin containing a great deal of interesting information on the coatings of **Armco Spiral Welded Pipe,** their selection, probable life and other data. For a copy of this bulletin write the manufacturer, mentioning this magazine, please.

Father—I am going to send you a-broad.
Son—What's her name, Dad?

"The handiest gadget on the job!"

Is what YOU



will say after your first order of Quick Repair Washers comes in. . . . eliminates end thrust . . . keeps gears and pinions in mesh. . . saves wear and tear . . . puts a stop to costly shut-downs.

Order Now «» the first repair may save you the cost of a year's supply.

When ordering give inside and outside diameters and thickness of washers required.

BUCYRUS-ERIE COMPANY
Specialty Department
BUCYRUS ERIE South Milwaukee, Wisconsin

Reports submitted by the **Highway Location** Committee of the **American Road Builders' Association,** including: Classification of Highways, Right-of-Way, Visibility, Grade Crossings, Bridges and Culverts, Spur Roads, Distribution of Construction Costs, Allowable Gradient for Highways and Highway Curves, were recently published in Bulletin No. 18. In the 80 pages of this booklet many illustrations are used. For further information write the Association at Suite 938, National Press Building, Washington, D. C.

The American Rolling Mill Company, Middletown, Ohio, has just published an attractively illustrated handbook of forty pages (8½ x 11 inches) on Armco Spiral Welded Pipe, which contains specific information helpful to the user of specially designed pipe requiring a range of diameters from six to twenty-four inches, and a variety of wall thicknesses. It describes the spiral welding process and the economies to be derived by using this product; it contains size, weight, and pressure tables; it discusses the various types of coatings, couplings, joints, fittings, and flanges. There are also tables for converting pounds pressure per square inch into feet head of water, and vice versa, information on car loadings, and complete specifications for spiral welded pipe. For a copy of this booklet write The American Rolling Mill Company, mentioning this magazine.

The recovery of sand and gravel from a deposit partially above and partially below water level by a single operation is described in a report just issued by the **United States Bureau of Mines.** The report, by Ralph L. Windrow, is one of a series describing the technique of methods used and costs obtained at representative sand and gravel plants. Copies of this Information Circular, Number 6581, titled "Methods and Costs of Mining and Preparing Sand and Gravel at the Cloudy Plant of the Dallas Washed and Screened Gravel Company, Dallas, Texas," may be obtained free from the U. S. Bureau of Mines, Department of Commerce, Washington, D. C.

TRADE NOTES

An announcement of interest to the road construction and maintenance industry is the purchase of the Ryan line of leaning frame and leaning wheel blade graders and motor patrol by **Allis-Chalmers Mfg. Company,** Milwaukee, Wis. This line of graders formerly manufactured by the Ryan Manufacturing Company of Chicago will be manufactured at LaPorte, Indiana in the plant of the Advance-Rumley Corporation which was also recently acquired by Allis-Chalmers.

Chicago Pneumatic Tool Company, 6 E. 44th Street, New York, announces the appointment of the **H. O. Penn Machinery Company,** 140th Street and East River, New York City, as a sales agent in the territory covered by that large, well-known firm. The products to be handled include portable and stationary compressors, rock drills, pavement breakers and similar CP pneumatic equipment. The H. O. Penn Organization has recently been augmented by Mr. D. D. Barnes, formerly Sales Manager for the Smith Engineering Works.

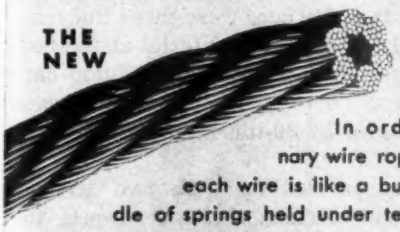
GEORGE F. DICKINSON

We regret to announce the death of George F. Dickinson who, until ill health forced his resignation recently, was Vice-President and Secretary of the S. G. Taylor Chain Company, Hammond, Indiana. He resided in Oak Park, Illinois, and was associated with the company for about twenty-two years. He served as secretary for a great many years and was elected vice-president as well as secretary about five years ago.

Gillette Publishing Company of 400 West Madison Street, Chicago, has purchased Good Roads and merged it with Roads and Streets.

Dora: "You can't tell how far a couple has gone in a car merely by looking at the speedometer!"

WHY YOU SAVE MONEY WITH LAY-SET



In ordinary wire rope each wire is like a bundle of springs held under tension. That is why the ends must be securely seized — in order to confine this tremendous internal stress.

It is easily understood why Lay-Set Preformed Wire Rope — in which internal stress is eliminated — gives from 30% to 300% increased service, depending on the type of equipment and nature of the service.

LAY•SET USERS GET 30% TO 300% INCREASED SERVICE

Figure what this substantial wire rope saving means to your producing costs. Add to this saving the expense of recabling, shutdowns, and corresponding loss of production. Here is a total saving that no wire rope user can afford to overlook.

The reason for this increased service is the *elimination of internal stress.* In Lay-Set Preformed Wire Rope, strands and wires are helically shaped and assembled in the form of a rope —each strand and wire fitting naturally in position . . . as contrasted with ordinary (non-preformed) wire rope in which the strands are forced to lie in their helical shapes under stress.

MAKE THIS TEST •

Let us send you a sample length of Lay-Set Preformed Wire Rope. It will come to you with the ends *unseized*— it isn't necessary to seize the ends of Lay-Set because the strands and wires lie normally in place.

Then remove a strand and note its perfect helical shape. Remove also a wire or two from the strand. The rope can then be re-assembled, and you cannot tell which strands or wires were removed.

REDUCE YOUR WIRE ROPE EXPENSE BY 10% TO 70% WITH

HAZARD LAY•SET PREFORMED WIRE ROPE

Mail this coupon today for your copy of "12 Reasons Why You Save Money with Lay-Set Preformed Wire Rope."

HAZARD WIRE ROPE

Established in 1846

HAZARD WIRE ROPE COMPANY
Wilkes-Barre, Pennsylvania

Send me by return mail your booklet entitled, "12 Reasons Why You Save Money with Lay-Set Preformed Wire Rope." E.E.—4-32

MAIL TODAY

Name .....

Address .....

Company .....

(Write on margin type of service)

When writing to Hazard Wire Rope Company, please use coupon or card bound in this issue.

Constructing hydraulic fill dam at Cobble Mountain

(Continued from Page 187)

The draglines were also used for stripping the damsite and scattering the large stones piled at the end of the rock chute fed by the grizzly just outside of the dissolving box. In the writer's opinion it is almost impossible to build a full hydraulic fill dam without draglines on the beaches.

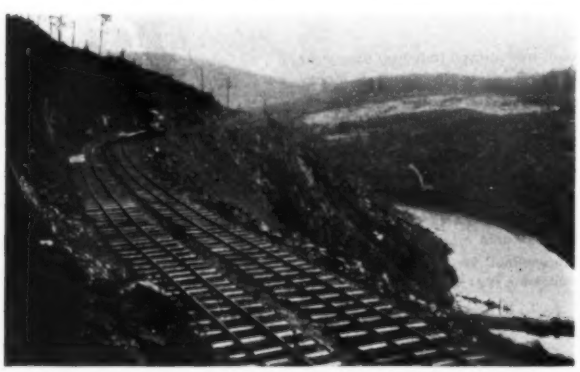
Allis-Chalmers pumps, capacity 16,000 gallons per minute, with lifts against heads of 60 feet to 150 feet were used. The steel pipes used were 28 inch diameter for water lines and mostly 20 inch diameter for mud lines.

In order to save water and due to sanitary restrictions down the river below the dam, it was necessary to use the water over again. As the water and the material came in through the mudline and discharged near the dike on the dam, the water eventually went to the core pool in the middle of the dam. On a pontoon in the core pool was placed one of the pumps which pumped the muddy water from the core pool into the lines feeding the giants at the borrow pits. Thus the same water was used over and over again. Whenever it was necessary to replenish the water in the core pool, a fresh supply of water was pumped into the core pool from the nearby river by means of another pump.

1,200,000 Yards Excavated by Shovels, Hauled by Trains and Placed in the Dam by Water

About 1,200,000 cubic yards hydraulic fill in the next 195 feet of the dam were placed by the following method:

Near the dam, at proper location and elevation, dissolving boxes, or what is commonly known as "hog boxes", were built. Double track 36-inch gauge railway lines were extended from the borrow pits to the dissolving boxes which were long and large enough so that a ten-car trainload could be dumped at once and about six train loads could be piled up in the box at a time.



Double track, narrow gauge, railway line built by the contractor to haul material from the borrow pit to the dam.

In the core pool on pontoons were mounted pumps to supply with the necessary pressure and volume of water the two giants placed at each end of the dissolving box. These two giants washed the material in the box and led them into the mud line leading to the two beaches or shoulders of the dam. Of course, for various reasons, the material was sent only to one beach at a time, and alternated as soon as necessary.

The maximum length of the track from the borrow pits to the dam was 9,000 feet with a maximum curvature of 40 degrees and a maximum grade of 7.2 per cent for empties and 2.5% up grade for loaded trains. There were three Bucyrus-Erie 50-B shovels digging the material at the borrow pits and loading onto 4-yard side dump cars of various makes. There were nine trains, each with ten cars, hauled by 20-ton Plymouth gasoline engines.

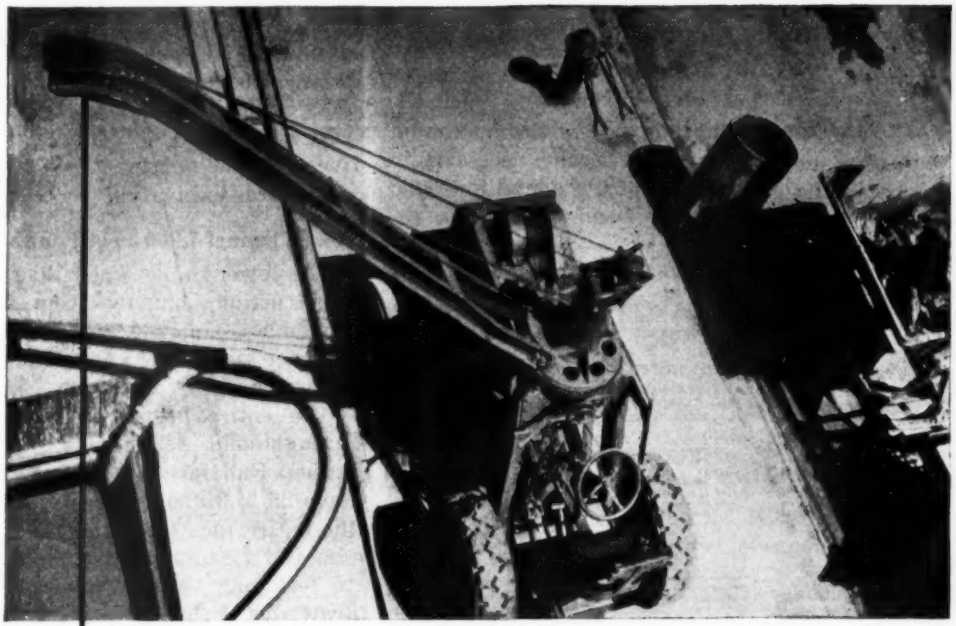
Spillway excavation, 50B-Bucyrus-Erie steam shovel in the bottom of the cut. Just above can be seen the Keystone well drilling machine on the top of the original ground.

The work was carried on with two 10-hour shifts per day and thirteen shifts per week, the day shift for Sunday being assigned to the repair of the equipment.

2500 Yards Placed per Shovel in 10-Hour Shift

The material consisted of glacial sand and gravel. The maximum rate of placing the material into the dam was 2,500 cubic yards per shovel per 10-hour shift. The general average per working day was 7,100 yards hydraulic fill placed in the dam. About 930,000 cubic yards material were placed in one season. Often there were unavoidable delays sometimes due to shovels, sometimes due to track, and then at the "hog box" or mud lines. The average output, however, was more than anticipated considering the many difficulties. The contractor should be commended for his efficient organization and aggressive drive of his force and operations.

(Continued on Page 218)



Cut handling costs *this new way!*

Put the Loadmaster on your job. Watch it place your materials handling on a profit-making basis, cut your yard and warehouse charges, speed up the placing of your steel, timber and machinery. This husky, compact, fast-working crane will load and unload trucks and cars; sort and pile stored materials; lift rock, pipe and transformers from and into trenches and manholes; serve machine tools; assist in overhauling and repair work. It will travel with its load and can be used as a tractor. It has no tail swing—operates in close quarters. Auxiliary units such as air-compressor, bulldozer, winch and magnet increase its usefulness. Write for complete specifications.

BUCYRUS ERIE **LOADMASTER**

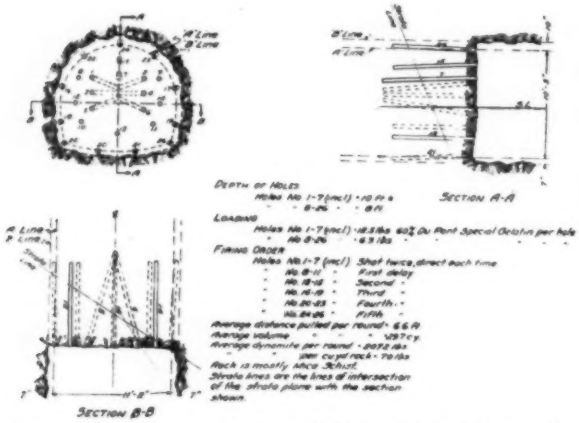
BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Constructing hydraulic fill dam at Cobble Mountain

(Continued from Page 216)

Near the top of the dam, above the maximum water level in the reservoir, it became necessary to do away with the dissolving box, the mud lines and the core pool pump. The railroad tracks were ex-



Diagrams showing method of drilling and shooting outlet tunnel headings.

tended all along the core pool on the shoulders on each side of the dam. Here the material was dumped from the cars directly into the pool. By gradual raising and throwing of the tracks the pool disappeared and the dam was topped.

The price paid for the hydraulic fill placed in the dam was fifty cents per cubic yard.

In addition to the excavating equipment already mentioned there were used on the project one Bucyrus-Erie 30-B with 7/8-yard dipper, one 7/8-yard Osgood, two Bucyrus-Erie Type B steamers with 5/8-yard dippers.

Cutting Through 1,600 Foot Diversion Tunnel 12 Feet in Diameter

The diversion tunnel and the diversion dam (55,000 cubic yards of rock fill) were built by Coleman Brothers, Inc., of Boston, Massachusetts from August 3, 1927 to December 11, 1928.

The entire length of the diversion tunnel was through solid rock, characteristic mica schist of this region, After several trials a full face heading method was started by putting in about 43 holes. The cut-holes were about 13 feet and the others about 12 feet, with an average draw of about 10½ foot per round. The holes were shot in four volleys. The average linear foot of drilling was 8.7 and the consumption of dynamite was 5.2 pounds per cubic yard of solid rock excavation. The general average of the explosives for the entire tunnel was about 6 pounds per cubic yard, mostly 60% Atlas gelatin dynamite being used. There was used one 1,000 cubic foot Laidlaw stationary electric air compressor, one Type No. 50 Ingersoll-Rand pneumatic drill sharpener with oil furnace, and an air driven Hoar mucking machine for loading the muck into one-yard steel side dump cars which were hauled out with small Plymouth gas locomotives over the narrow gauge track. There were 6.3 cubic yards excavation per linear foot of tunnel.

Power Tunnel 7,200 Feet Long, 10 Feet in Diameter

The power tunnel was built by the Frazier-Davis Construction Company from August 4th, 1928 to September 11, 1930 and completed ahead of the contract time. The contractor received $3,700.00 bonus for early completion.

The entire length of this tunnel was driven through solid rock similar to that of the diversion tunnel. Full face heading method was used with from 25 to 32 holes, mostly, however, 26 holes for the entire face consisting of 7 cut-holes, 8 relievers, and 11 square ups. The cut-holes were about 10 feet long and the others 8 feet. The average draw was about 7 feet per round and the average dynamite consumption, exclusive of the tunnel trimming, was about 7 pounds per cubic yard of excavation. DuPont 40% and 60% special gelatin dynamite was used. There were 4.5 cubic yards excavation per linear foot of tunnel.

There were used by Frazier-Davis, Leyners for drilling; electric driven Conway mucking machines for mucking; one-yard wooden end dump

Osgood gas shovel loading rock for rip rap to International truck.

cars for transportation of muck; mules and Mancha electric dinkeys for hauling; Coppus Vano blowers for ventilation; two Ingersoll-Rand stationary electric air compressors, and a Sullivan S-55 drill sharpener with coal furnace. A study of the power tunnel excavation costs per cubic yard of rock revealed the following distribution:

Labor	69.6%
Explosives	11.8%
Power	5.4%
Fuel	0.7%
Equipment	12.5%

(Concluded on Page 220)

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

SHOVEL OPERATOR

12 years' experience on Gas+Air and steam machines on highway grading and basement excavating. Willing to go any place in U.S.A. Married. Can do own repair work and furnish reliable references. Present location, North Carolina. Box 3301.

DRAGLINE OPERATOR

Experience covers 11 years' on Diesel and gasoline draglines on drainage, canal, levee and rock work. Willing to go anywhere in U.S.A. Married. 30 years old. Can handle own repair work and furnish A-1 references. Present location, Arkansas. Box 3302.

CRANE-SHOVEL OPERATOR

16 years' of experience operating gasoline and steam machines on highway and rock grading and general excavating. Prefer operating small gas or steam shovel anywhere in the East. Married. Age 36 years. Can do own repair work and furnish first class references. Present location, New York. Box 3303.

CONSTRUCTION AND MAINTENANCE ENGINEER

Over 25 years' experience on all types of shovel, cranes, locomotives on general construction work. Capable of taking full charge of crew. At present located in Australia. Available for work in New Zealand, China or Federated Malay States. Can furnish excellent recommendations. Address replies to W. J. A., 22 Ruthven Street, Waverly, N. S. Wales, Australia.

CRANE-SHOVEL OPERATOR

Have 35 years' experience on gasoline and steam machines on highway and railroad grading; canal and quarry rock. Willing to anywhere in U.S.A. on any size or make shovel. Married. Can furnish the very best of references and can handle own repair work. Present location, South Carolina. Box 3304.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie Diesel, E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California but will go anywhere. Box 3305.

DRAGLINE-SHOVEL OPERATOR

14 years' experience on Diesel, gasoline and steam machines on highway grading and levee building. Would like to operate dragline anywhere in U. S. A. Married. Can do own repair work. A-1 references. Present location, Arkansas. Box 3306

SHOVEL OPERATOR

Have 13 years' experience on Diesel, gasoline, Gas+Air, electric and steam machines on highway and railroad grading, quarry work and general excavating. Married. Willing to go anywhere. Can do any repair and service work. Familiar with Diesel engines. Reliable references. Present location, Tennessee. Box 3307.

HOPPER OPERATOR

Wanted—Bachelor job as hopper operator on road work. Fully experienced on all types of highway building. Can also serve as tractor operator. Single. 30 years' old. Willing to go anywhere in U.S.A. Reliable references furnished. Present location, Indiana. Box 3308.

SUPERINTENDENT-DRAGLINE OPERATIONS

Have superintended dragline and shovel work for many years on mining operations of various types, also rock quarries. Willing to go anywhere in U. S. A. 43 years old. Have excellent references regarding character and ability. Present location, Tennessee. Box 3211.

DRAGLINE-CRANE-SHOVEL OPERATOR

Over ten years' experience on gasoline, Diesel and steam machines on drainage, levee and mine stripping. Willing to go anywhere. Single. Can do own repair work. Reliable references. Present location, Texas. Box 3212.

EXCAVATING SUPERINTENDENT

Have years of experience as superintendent on all types of excavating work on large scale. Understand the building and operating of sand screens up to 50 carloads per day. Can operate gasoline and steam machines—Bucyrus-Erie preferred and can handle own repairing. Hold U. S. Civil Service rating of 91%. Can furnish excellent government references. Married. Present location, Maryland. Box 3213.

DRAGLINE-SHOVEL OPERATOR

8 years' experience on Diesel and gasoline machines on highway, street and general excavating. Willing to go anywhere. Married. Can do own repair work. Excellent references. Present location, Georgia. Box 3109.

DRAGLINE-CRANE-SHOVEL OPERATOR

Experience includes years operating electric, gasoline, Gas+Air and steam machines on all general types of excavating. Will go anywhere in U.S.A. Can do own repairing and furnish reliable references. Married. Present location, Indiana. Box 3108.

SHOVEL OPERATOR

15 years' experience on gasoline and steam machines. Willing to go anywhere in U.S.A. Married. Can handle own repair work. A-1 references. Present location, South Dakota. Box 3107.

DRAGLINE OPERATOR

Have years of experience on gasoline draglines on drainage, levees and highway work. Will go any place on any type of machine. Married. Can furnish reliable references. Can do own repair work. Present location, Virginia. Box 3106.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

19 years' experience on railroad construction, street, highway and basement excavating. Prefer position on steam or gasoline on any make machine. Can do own repair work. Will go anywhere. Married. Can furnish the best of references. Present location, Virginia. Box 3105.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

22 years' experience on Gas+Air, gasoline and steam machines on highway, coal stripping operations, irrigation work, pile driving and many other miscellaneous jobs. Will go any place in U.S.A. Can handle own repair work. Married. Can furnish excellent references. Present location, New York state. Box 3004.

DRAGLINE-SHOVEL OPERATOR

Have operated large electric and steam stripping machines on coal stripping operations. Also experienced on construction work. Prefer operating electric stripper anywhere. Can do own repair work. Married. Reliable references furnished. Present location, Illinois. Box 3002.

DRAGLINE-CRANE-CLAMSHELL OPERATOR

13 years' experience on Diesel, Gas+Air, gasoline and steam machines on highway, quarry and construction work. Will accept operating work anywhere. Can handle own repair work and furnish best of references. Married. Present location, Maryland. Box 3003.

SHOVEL OPERATOR

Have ten years' experience on Gas+Air, gasoline and steam shovels. Willing to go anywhere in U. S. A. Married. Best of references. Can do own repair work. Present location, Wisconsin. Box 3203.

DRAGLINE-SHOVEL OPERATOR

Experienced on Bucyrus-Erie D-2 and 30-B Diesel machines, on highway grading and canal drainage. Will go anywhere. Married. Age 37. Reliable references furnished. Can handle own repair work. Present location, Kentucky. Box 3204.

DRAGLINE-CRANE-SHOVEL OPERATOR

Have nine years' experience on gasoline, electric, Diesel and steam machines on highway, subway, sewer and hydro-electric work. Prefer operating gas or Diesel machine any place. Married. Can do own repairing. At present located in New York State. Box 3205.

DRAGLINE-CRANE-SHOVEL OPERATOR

Experience covers eighteen years on large and small gasoline, Diesel and steam machines on general excavation, scow loading, lock and dam excavating. Willing to go anywhere on large or small machine. Married. Can furnish excellent recommendations. Fully capable of handling any repair work on machines. Present location, Illinois. Box 3206.

DRAGLINE-SHOVEL OPERATOR

Experienced on Diesel, Gas+Air and gasoline machines on highway grading and pit stripping. Willing to go anywhere in U. S. A. or South America. A-1 references. Can do own repair work. Present location, Florida. Box 3207.

CLAMSHELL-SHOVEL OPERATOR

Experience covers twenty-one years in quarry, sand and gravel loading. Prefer operating Bucyrus-Erie steam shovel in central states. Can do own repair work. Excellent references furnished. Married. Present location, Ohio. Box 3208.

CLAMSHELL-SHOVEL OPERATOR

Thirteen years' experience on railroad, canal, highway, street and basement excavating. Can carry A-1 grade and produce yardage. Can do all necessary repair work and furnish reliable references. Present location, Ohio. Box 3209.

Constructing hydraulic fill dam at Cobble Mountain

(Concluded from Page 218)

The Cobble Mountain Dam was built by the Springfield Board of Water Commissioners, with E. E. Lochridge as Chief Engineer, the late Allen Hazen as Consulting Engineer, and the writer as Division Engineer in charge of the construction.

The principle contractors on the project were S. J. Groves & Sons Company of Minneapolis, Minnesota with E. F. Leese as General Superintendent.

The dam contract was started by the original contractor in August, 1928. With the concrete toe dam completed, the foundation of the main dam finished, the cut-off-trenches, the concrete cut-off-walls and the grouting almost completed; about 160,000 cubic yards of hydraulic fill and 190,000 yards of rock fill in the dam and about 38,000 yards of rock in the spillway excavated, the contract was relet to S. J. Groves & Sons Company in July, 1930. They successfully completed the work in 1931. When S. J. Groves & Sons took over the contract Burr M. Stark, Contractor, Troy, N. Y., handled the remaining concrete work.

A small part of the rock fill was done by S. J. Groves & Sons Company but most of it and also the riprap were sublet to the Lakewood Construction Company of Worcester, Massachusetts.

Almost the entire project is now completed except some highway work and general cleaning up. At this writing there is 135 feet deep water backed by the dam.

"I've lost my Austin."
"How come?"
"When I went to crank the darn thing she flew off the handle into the tall grass, and I haven't found it yet."

"Mamma," said little Elsie, "I never see any pictures of angles with whiskers. Do men go to heaven?"
"Well," said the mother, thoughtfully, "some men go to heaven, but they get there by a close shave."

"So your husband tried to get a government job? What is he doing now?"
"Nothing, he got the job."

Patron: "May I have some stationery?"
Hotel Clerk (haughtily): "Are you a guest of the house?"
Patron: "Heck, no. I am paying twenty dollars a day."

"A woman can make a fool of you in ten minutes," remarked the wise young man.
"Ah, but think of those ten minutes," sighed the wiser and older gent.

Cop: "Where are you going at 50 an hour?"
Motorist: "To the game."
Cop: "Just a minute and I'll give you a ticket!"

Ted: "My feet burn like the dickens; do you think a mustard bath would help?"
Ned: "Sure! There's nothing better than mustard for hot dogs!"

Ella "Where does Bella get her good looks, from her father or her mother?"
Stella: "From her father; he keeps a drug store."

FOR SALE

Space under this heading is available at the following rates, payable in advance of publication:

1 to 3 inches	$5.50 an inch net
Over 3 to 7 inches	5.25 an inch net
Over 7 inches	5.00 an inch net

An inch is measured vertically on one column—three columns to a page. Any space may be used measured by the even inch in height and by one, two or three columns in width.

The price per inch is based on total space used—multiply ad. space by number of continuous insertions.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

ERIE TYPE B-2 HIGH LIFT STEAM SHOVEL. "Cat" mounted. Good operating condition. Will rent. Box 316-SS.

OSGOOD GASOLINE ONE-CUBIC-YARD COMBINATION SHOVEL-CLAMSHELL-DRAGLINE. Six cylinder Beaver motor. Overhauled late 1931. Bargain price. Box 323-SS.

ERIE TYPE B-2 high lift steam shovel, "Cat" mounted. Good operating condition. Will rent. Priced to sell. Box 286-SS.

One P & H 400 ¾-cubic-yard Gas shovel, recently rebuilt and in good condition. Real value. Located near LaCrosse, Wisconsin. Box 307-SS.

ERIE-GAS+AIR 1¼-cubic-yard shovel rebuilt in August on new style "cata." Used three months. Will rent. Box 287-SS.

LIMA 101, 1½-CUBIC-YARD GASOLINE ROPE CROWD SHOVEL. Electric starter and lights. Shipped from factory late 1930. Excellent condition. Will rent. Box 322-SS.

BUCYRUS-ERIE 1½-CUBIC YARD HIGH LIFT GASOLINE SHOVEL. Out of factory only one and one-half years. Excellent condition. Will sell right. Located Wisconsin. Box 319-SS.

ERIE TYPE B-2 STANDARD STEAM SHOVEL, "Cat" mounted. Located near New York City. Will rent. Box 317-SS.

USED TYPE "O" THEW STEAM SHOVEL, shop number about 2100; 20' boom, 16' dipper handle, ¾-yd. dipper. Good running condition. Located Milwaukee vicinity. Bargain. Box 261-SS.

ERIE GAS+AIR 1¼-CUBIC-YARD HIGH LIFT SHOVEL. Late style single shaft "Cats". Used less than six months since receiving factory rebuilding. First class condition. Located near Birmingham, Alabama. Will sell for equity but worth considerably more. Box 318-SS.

MARION MODEL 36 STEAM STRIPPING SHOVEL, shop number about 4100, 30-foot boom, 18-foot 6-inch dipper handle, 2-cubic-yard dipper, caterpillar mounted. Located near Isabel, South Dakota. Approximately $2000.00 worth of spare parts included. Immediately available. Priced to sell. Box 233-SS.

P&H MODEL 204. Shop number above 2200, combination Shovel Clamshell. 19' shovel boom, 14'6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS.

ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of the Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

USED 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, including Dragline Equipment. Box 251-SS.

ONE REBUILT B-2 standard steam shovel, power boom hoist, new style "Cata." Factory guaranteed. Box 252-SS.

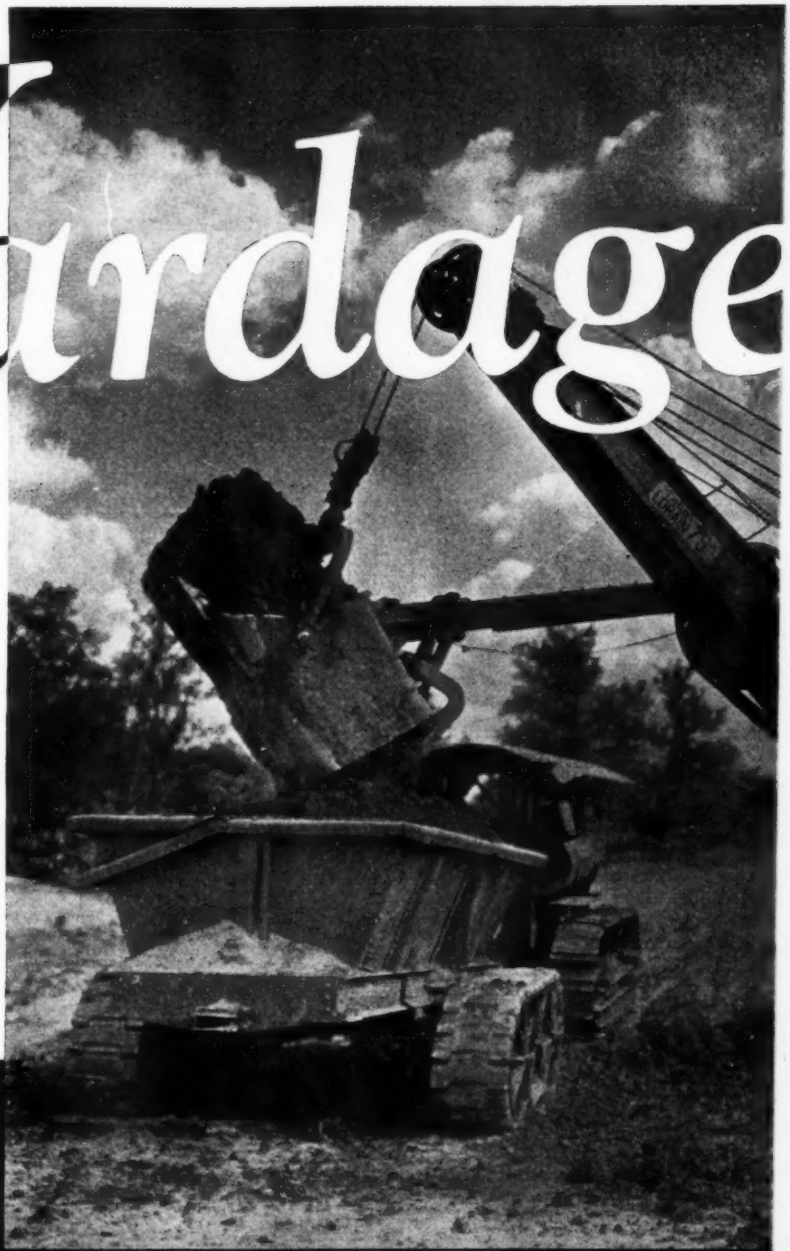
ERIE TYPE-B high lift steam shovel rebuilt July 1931 including new boiler. Since used 4 months. Excellent condition. Will rent. Box 285-SS.

REBUILT GA-2 ERIE SHOVEL mounted on new single shaft caterpillar, 1¼-cubic-yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

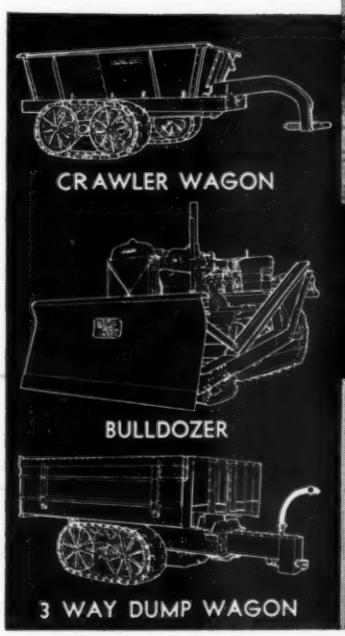
BUCYRUS-ERIE SLIGHTLY USED 1½-CUBIC YARD ROPE CROWD GASOLINE SHOVEL. "Cat" mounted. Electric starter. Carries same guarantee as new machine. Box 320-SS.

Yardage



Yardage

Yes, with a big "Y". Consecutive profitable hour haulage records are eclipsed every day with LaPlant-Choate "Roadlayer Wagons". Only "Roadlayer Wagons" can give you that performance which means maximum dollars and cents profit to the earth-moving contractor.



Sold and Serviced by "Caterpillar" Deale

LaPLANT-CHOATE MANUFACTURING CO., In
CEDAR RAPIDS, IOWA, U. S. A.

LA PLANT-CHOATE
EARTH MOVING EQUIPMENT

For your convenience in writing to LaPlant-Choate Mfg. Co., you will find a card bound in this issue.

1. Working 2 shifts of 8-hours a day, four of these Bucyrus-Erie Gas+Air shovels load out 50,000 cubic yards per month from the 6-foot bank of rock. 2. There is not even an instant delay for trucks in loading with the two-truck-spot system. 3 Looking across the channel where the Macks roar up the 8-percent ramp to the dump. 4. Channelling by line drill method with a gang of 8 Worthingtons mounted on one of the Mack drill boats. 5. The whole job is brilliantly lighted at night by GE floodlights. Note these lights on the dump.